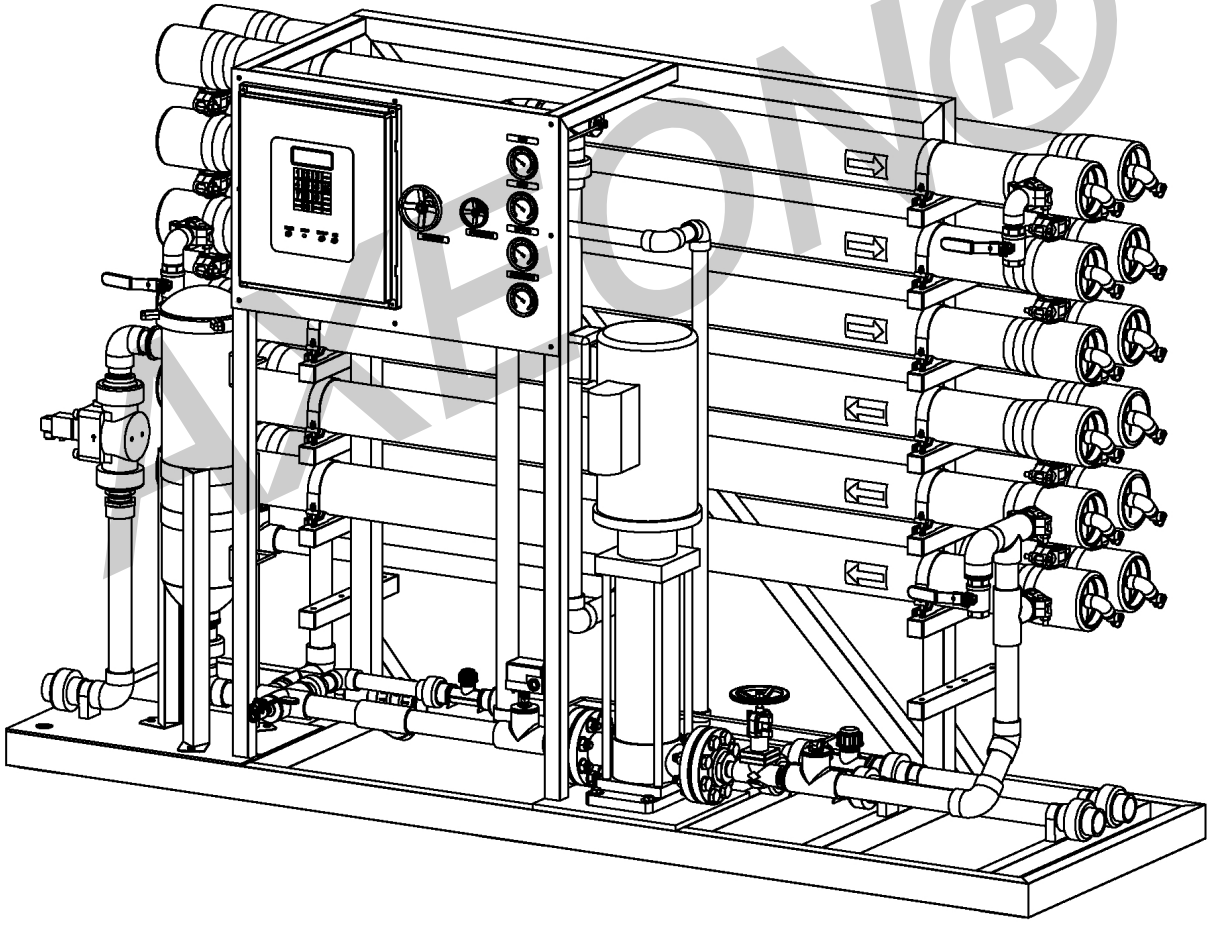
Reverse Osmosis User's Manual

Model

M1-4240, M1-6240, M1-8240,
M1-10240, M1-12240



M1-12240 Pictured

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INTRODUCTION

Your M1-Series system is a durable piece of equipment which, with proper care, will last for many years. This User's Manual outlines installation, operation, maintenance, and troubleshooting details vital to the sustained performance of your system.

The test results which are included with this User's Manual indicate your system's permeate (product) and concentrate (waste) test results.

If your system is altered at the site of operation or if the feed water conditions change, please contact your local dealer or distributor to determine the proper recovery for your application.

NOTE: IN ORDER TO MAINTAIN THE MANUFACTURER'S WARRANTY, AN OPERATING LOG MUST BE MAINTAINED AND COPIES WILL NEED TO BE SENT TO YOUR LOCAL DEALER OR DISTRIBUTOR FOR REVIEW.

NOTE: PRIOR TO OPERATING OR SERVICING THE REVERSE OSMOSIS SYSTEM, THIS USER'S MANUAL MUST BE READ AND FULLY UNDERSTOOD. KEEP THIS AND OTHER ASSOCIATED INFORMATION FOR FUTURE REFERENCE AND FOR NEW OPERATORS OR QUALIFIED PERSONNEL NEAR THE SYSTEM.

SAFETY

The Safety section of this User's Manual outlines the various safety headings used throughout this manual's text and are enhanced and defined below:

NOTE: INDICATES STATEMENTS THAT PROVIDE FURTHER INFORMATION AND CLARIFICATION.

CAUTION: INDICATES STATEMENTS THAT ARE USED TO IDENTIFY CONDITIONS OR PRACTICES THAT COULD RESULT IN EQUIPMENT OR OTHER PROPERTY DAMAGE.

WARNING: INDICATES STATEMENTS THAT ARE USED TO IDENTIFY CONDITIONS OR PRACTICES THAT COULD RESULT IN INJURY OR LOSS OF LIFE. FAILURE TO FOLLOW WARNINGS COULD RESULT IN SERIOUS INJURY OR EVEN DEATH.

DO NOT UNDER ANY CIRCUMSTANCE; REMOVE ANY CAUTION, WARNING, OR OTHER DESCRIPTIVE LABELS FROM THE SYSTEM.

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FEED WATER AND OPERATION SPECIFICATIONS

Nothing has a greater effect on a reverse osmosis system than the feed water quality.

NOTE: IT IS VERY IMPORTANT TO MEET THE MINIMUM FEED WATER REQUIREMENTS. FAILURE TO DO SO WILL CAUSE THE MEMBRANES TO FOUL AND VOID THE MANUFACTURER'S WARRANTY.

Operating Limits

Maximum Feed Temperature °F (°C)	85 (29)	Maximum Free Chlorine ppm	0
Minimum Feed Temperature °F (°C)	40 (4.4)	Maximum TDS ppm	2,000
Maximum Ambient Temperature °F (°C)	120 (48.9)	Maximum Hardness gpg	0
Minimum Ambient Temperature °F (°C)	40 (4.4)	Maximum pH (Continuous)	11
Maximum Feed Pressure psi (bar)	85 (5.9)	Minimum pH (Continuous)	5
Minimum Feed Pressure psi (bar)	45 (3.1)	Maximum pH (Cleaning 30 Min.)	12
Maximum Operating Pressure psi (bar)	200 (13.8)	Minimum pH (Cleaning 30 Min.)	2
Maximum SDI Rating SDI	<3	Maximum Turbidity NTU	1

Test Parameters: 550 TDS Filtered (5 Micron), De-Chlorinated, Municipal Feed Water, 65 psi (4.5 bar) Feed Pressure, 100 psi (6.89 bar) Operating Pressure, 77 Degrees F (25 Degrees C), Recovery as stated, 7.0 pH. Data taken after 60 minutes of operation.

Low temperatures and high feed water TDS levels will significantly affect the system's production capabilities. Computer projections should be run for individual applications which do not meet or exceed minimum and maximum operating limits.

Scale prevention measures must be taken to prolong membrane life.

NOTE: HIGHER FEED TDS AND/OR LOWER TEMPERATURES WILL REDUCE THE SYSTEM'S PRODUCTION.

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REJECTION, RECOVERY AND FLOW RATES

M1-Series reverse osmosis systems are designed to produce permeate water at the capacities indicated in the "design basis section" on page 22 of this manual. For example, the M1-12240 produces 25 gallons per minute of permeate water at the listed operating test conditions.

The amount of total dissolved solids (TDS) rejected by the membrane is expressed as a percentage. For example, a 99% rejection rate means that 99% of total dissolved solids do not pass through the membrane. To calculate the % rejection, use the following formula:

% Rejection = [(Feed TDS – Product TDS) / Feed TDS] x 100

Example:

99% = [(550-5.5)/550] x 100

NOTE: ALL TDS FIGURES MUST BE EXPRESSED IN THE SAME UNITS, TYPICALLY PARTS PER MILLION (PPM) OR MILLIGRAMS PER LITER (MG/L).

M1-Series reverse osmosis systems are designed to reject up to 99% NaCl, unless computer projections have been provided or stated otherwise.

The amount of permeate water recovered for use is expressed as a percentage. To calculate % recovery, use the following formula:

% Recovery = (Product Water Flow Rate / Feed Water Flow Rate) x 100

Example:

66% = (25/38) x 100

% Rejection = [(Feed TDS – Product TDS) / Feed TDS] x 100

Example:

99% = [(550-5.5)/550] x 100

NOTE: ALL FLOW RATES MUST BE EXPRESSED IN THE SAME UNITS.

SYSTEM REQUIREMENTS AND OPERATION GUIDELINES

PLUMBING

The membranes and high pressure pumps used on M1-Series systems require a continuous flow of water with a minimum feed pressure of 45 psi, not to exceed 90°F.

FEED WATER CONNECTION

1. Locate the 1-1/2” FNPT Solenoid Valve feed water inlet. (Figure 1A, Page 17)
2. Attach the inlet piping to the 1-1/2” FNPT Solenoid Valve feed water inlet.
3. Be certain that all of the dissolved solids within the feed water are soluble at the concentrations attained in the system.

PERMEATE (PRODUCT WATER) CONNECTION

Locate the 1" or 1-1/2” connection labeled permeate and attach to storage tank. Ensure that the permeate water can flow freely with no backpressure. Backpressure can cause irreversible damage to the membrane elements. The 1" or 1-1/2” permeate line can be run to the holding tank with PVC fittings, or other FDA approved materials. This is so the material being used does not dissolve into the permeate water.

CAUTION THE pH OF THE REVERSE OSMOSIS PERMEATE WATER WILL TYPICALLY BE 1-2 pH UNITS LOWER THAN THE FEED WATER pH. A LOW pH CAN BE VERY AGGRESSIVE TO SOME PLUMBING MATERIALS SUCH AS COPPER PIPING.

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CONCENTRATE (WASTE WATER) CONNECTION

Locate the 1" or 1-1/2" connection labeled concentrate and attach to a drain. Run the concentrate line to an open drain in a free and unrestricted manner (no backpressure). It is advised that an air-break be used on the concentrate line to prevent siphoning of water from the pressure vessels when the system is in standby.

CAUTION: ANY RESTRICTIONS OR BLOCKAGE IN THE DRAIN LINE CAN CAUSE BACKPRESSURE, WHICH WILL INCREASE THE SYSTEM'S OPERATING PRESSURE. THIS CAN RESULT IN DAMAGE TO THE SYSTEM'S MEMBRANES AND COMPONENTS.

ELECTRICAL

The motor used on the M1-Series systems are pump and motor combination. The motor is available in 220/460 Volt, 50/60 Hertz, 3 phase. Each M1-Series system is equipped with a 5 foot electrical cord.

Ensure that the electrical circuit supplying the system is compatible with the requirements of the specific M1 model you are installing.

NOTE: IT'S RECOMMENDED THAT A LICENSED ELECTRICIAN WIRE YOUR SYSTEM IN ACCORDANCE WITH LOCAL AND NATIONAL ELECTRICAL CODES (NEC).

WARNING: TO REDUCE THE RISK OF ELECTRICAL SHOCK, THE INCOMING POWER SUPPLY MUST INCLUDE A PROTECTIVE EARTH GROUND.

M1-Series systems are typically controlled with a liquid level switch in a storage tank. The liquid level switch turns the system on when the water level in the tank drops, and off when the tank is full. Liquid level switches can be obtained by your local dealer or distributor. If a liquid level switch is to be used, install it at this time.

PRE-FILTRATION

M1-Series systems are supplied with a 5 micron sediment bag filter. Change the bag filter once a month or when a 10-15 psi differential exists between the two pre-filter gauges. Ask your local dealer or distributor about Pre-Filtration systems, if required.

NOTE: THE SYSTEM MUST BE OPERATED USING FILTERED FEED WATER ONLY.

PUMP

The pump used on the M1-Series systems is of the multi-stage centrifugal stainless steel type.

Follow these guidelines to ensure proper operation of the pump:

- The pump must **NEVER** be run dry. Operating the pump without sufficient feed water will damage the pump.

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- **ALWAYS** feed the pump with filtered water. The pump is susceptible to damage from sediment and debris.

- If any damage occurs to your system's pump a re-build kit may be available. Contact your local dealer or distributor and inform them of your system's model and pump size.

MOUNTING

The free standing system should be bolted down in compliance with local regulation standards or securely fastened.

MEMBRANE ELEMENTS

M1-Series reverse osmosis systems come pre-loaded with Thin Film Composite (TFC) HF4 High Flow Extra Low Energy membranes, unless otherwise specified. General membrane element performance characteristics are listed on the following pages:

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HF4-STANDARD

- Membrane Type: Polyamide Thin-Film Composite
- Maximum Operating Temperature: 113°F (45°C)
- Maximum Operating Pressure: 600 psi (41 bar)
- pH Range, Continuous Operation*: 2 – 11
- pH Range, Short Term Cleaning (30 Min.): 1 – 13
- Maximum Feed Silt Density Index: 5
- Chlorine Tolerance: 0 ppm

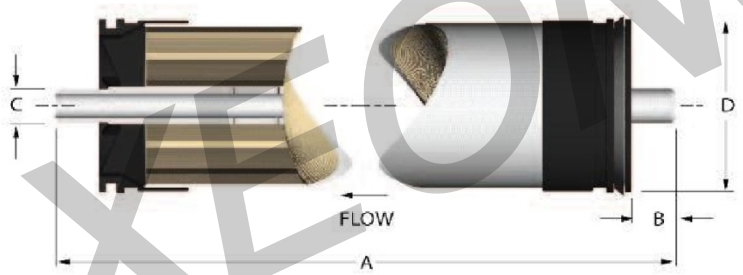
* Maximum temperature for continuous operations above pH10 is 95° F (35°c)

Product Specifications

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200386	HF4 – 2514	100 (6.89)	225 (0.85)	99.0
200387	HF4 – 2521	100 (6.89)	400 (1.51)	99.0
200388	HF4 – 2540	100 (6.89)	850 (3.22)	99.0

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200389	HF4 – 4014	100 (6.89)	600 (2.27)	99.0
200390	HF4 – 4021	100 (6.89)	1000 (3.79)	99.0
200391	HF4 – 4040	100 (6.89)	2500 (9.46)	99.0

Test Parameters: 550 TDS Filtered (5 Micron), De-Chlorinated, Municipal Feed Water, 77 Degrees F, 15% Permeate Recovery, 6.5 - 7.0 pH Range, at the Specified Operating Pressure. Data Taken After 30 Minutes of Operation. Maximum Pressure drop for each element is 13 psi. Minimum salt rejection is 96%. Permeate flow for individual elements may vary +/- 20%.



Dimensions inch (mm)

Description	A	B	C	D
HF4 – 2514	14 (355.6)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)
HF4 – 2521	21 (533.4)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)
HF4 – 2540	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)

Description	A	B	C	D
HF4 – 4014	14 (355.6)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
HF4 – 4021	21 (533.4)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
HF4 – 4040	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)

Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, the manufacturer recommends removing residual free chlorine by pretreatment prior to membrane exposure. Wet tested membrane elements must be kept sealed and moist when in storage. Drying out may occur and damage the membrane permanently. Prevent elements from freezing or being exposed to direct sunlight. Wet tested elements are vacuum sealed in a polyethylene bag containing 1.0% sodium meta-bisulfite and then packaged in a cardboard box. Discard the permeate for the first twenty-four hours of operation. The permeate flow (product water flow) varies with feed water temperature. For membrane warranty information, please contact the manufacturer.

The manufacturer believes the information and data contained herein to be accurate and useful. The information and data are offered in good faith, but without guarantee, as conditions and methods of use of products are beyond the manufacturer's control. The manufacturer assumes no liability for results obtained or damages incurred through the application of the presented information and data. It is the user's responsibility to determine the appropriateness of these products for the user's specific end uses.

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HF5-OPTIONAL

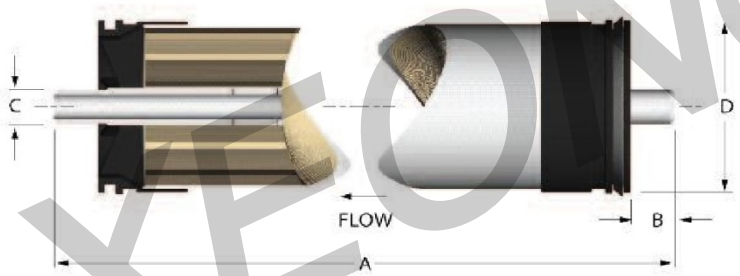
- Membrane Type: Polyamide Thin-Film Composite
- Maximum Operating Temperature: 113°F (45°C)
- Maximum Operating Pressure: 400 psi (27.58 bar)
- pH Range, Continuous Operation*: 2 – 11
- pH Range, Short Term Cleaning (30 Min.): 1 – 13
- Maximum Feed Silt Density Index: 5
- Chlorine Tolerance: 0 ppm

* Maximum temperature for continuous operations above pH10 is 95° F (35°c)

Product Specifications

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate psi (gpd)	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200392	HF5 – 4014	80 (5.52)	600 (2.27)	100 (6.89)	720 (3.72	98.5
200393	HF5 – 4021	80 (5.52)	1000 (3.79)	100 (6.89)	1200 (4.54)	98.5
200394	HF5 – 4040	80 (5.52)	2500 (9.46)	100 (6.89)	3000 (11.36)	98.5

Test Parameters: 550 TDS Filtered (5 Micron), De-Chlorinated, Municipal Feed Water, 77 Degrees F, 15% Permeate Recovery, 6.5 - 7.0 pH Range, at the Specified Operating Pressure. Data Taken After 30 Minutes of Operation. Maximum Pressure drop for each element is 13 psi. Minimum salt rejection is 96%. Permeate flow for individual elements may vary +/- 20%.



Dimensions inch (mm):

Description	A	B	C	D
HF5 – 4014	14 (355.6)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
HF5 – 4021	21 (533.4)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
HF5 – 4040	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)

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Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, the manufacturer recommends removing residual free chlorine by pretreatment prior to membrane exposure. Wet tested membrane elements must be kept sealed and moist when in storage. Drying out may occur and damage the membrane permanently. Prevent elements from freezing or being exposed to direct sunlight. Wet tested elements are vacuum sealed in a polyethylene bag containing 1.0% sodium meta-bisulfite and then packaged in a cardboard box. Discard the permeate for the first twenty-four hours of operation. The permeate flow (product water flow) varies with feed water temperature. For membrane warranty information, please contact the manufacturer.

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NF3-OPTIONAL

- Membrane Type: Polyamide Thin-Film Composite
- Maximum Operating Temperature: 113°F (45°C)
- Maximum Operating Pressure: 600 psi (41 bar)
- pH Range, Continuous Operation*: 2 – 11
- pH Range, Short Term Cleaning (30 Min.): 1 – 12
- Maximum Feed Silt Density Index: 5
- Chlorine Tolerance: 0 ppm

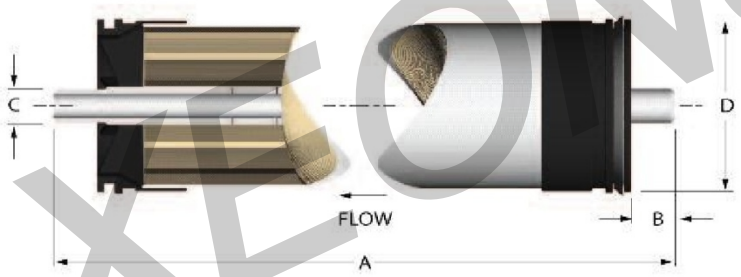
* Maximum temperature for continuous operations above pH10 is 95° F (35°c)

Product Specifications

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200401	NF3 – 2514	70 (4.83)	200 (0.76)	40 – 50
200402	NF3 – 2521	70 (4.83)	350 (1.33)	40 – 50
200403	NF3 – 2540	70 (4.83)	850 (3.22)	40 – 50

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200404	NF3 – 4014	70 (4.83)	400 (1.51)	40 – 50
200405	NF3 – 4021	70 (4.83)	1000 (3.79)	40 – 50
200406	NF3 – 4040	70 (4.83)	2500 (9.46)	40 – 50

Test Parameters: 550 TDS Filtered (5 Micron), De-Chlorinated, Municipal Feed Water, 77 Degrees F, 15% Permeate Recovery, 6.5 - 7.0 pH Range, at the Specified Operating Pressure. Data Taken After 30 Minutes of Operation. Maximum Pressure drop for each element is 13 psi. Minimum salt rejection is 96%. Permeate flow for individual elements may vary +/- 20%.



Dimensions inch (mm)

Description	A	B	C	D
NF3 – 2514	14 (355.6)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)
NF3 – 2521	21 (533.4)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)
NF3 – 2540	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)

Description	A	B	C	D
NF3 – 4014	14 (355.6)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
NF3 – 4021	21 (533.4)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
NF3 – 4040	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)

Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, the manufacturer recommends removing residual free chlorine by pretreatment prior to membrane exposure. Wet tested membrane elements must be kept sealed and moist when in storage. Drying out may occur and damage the membrane permanently. Prevent elements from freezing or being exposed to direct sunlight. Wet tested elements are vacuum sealed in a polyethylene bag containing 1.0% sodium meta-bisulfite and then packaged in a cardboard box. Discard the permeate for the first twenty-four hours of operation. The permeate flow (product water flow) varies with feed water temperature. For membrane warranty information, please contact the manufacturer.

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NF4-OPTIONAL

- Membrane Type: Polyamide Thin-Film Composite
- Maximum Operating Temperature: 113°F (45°C)
- Maximum Operating Pressure: 600 psi (41 bar)
- pH Range, Continuous Operation*: 2 – 11
- pH Range, Short Term Cleaning (30 Min.): 1 – 12
- Maximum Feed Silt Density Index: 5
- Chlorine Tolerance: 0 ppm

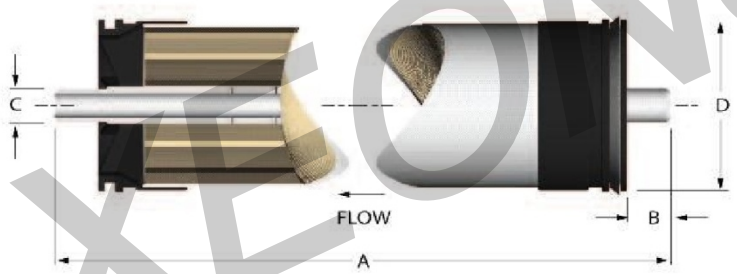
* Maximum temperature for continuous operations above pH10 is 95° F (35°c)

Product Specifications

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200407	NF4 – 2514	70 (4.83)	200 (0.76)	80 – 90
200408	NF4 – 2521	70 (4.83)	250 (0.95)	80 – 90
200409	NF4 – 2540	70 (4.83)	680 (2.57)	80 – 90

Part Number	Description	Applied Pressure psi (bar)	Permeate Flow Rate gpd (m3/d)	Nominal Salt Rejection (%)
200410	NF4 – 4014	70 (4.83)	400 (1.51)	80 – 90
200411	NF4 – 4021	70 (4.83)	950 (3.60)	80 – 90
200412	NF4 – 4040	70 (4.83)	2000 (7.6)	80 – 90

Test Parameters: 550 TDS Filtered (5 Micron), De-Chlorinated, Municipal Feed Water, 77 Degrees F, 15% Permeate Recovery, 6.5 - 7.0 pH Range, at the Specified Operating Pressure. Data Taken After 30 Minutes of Operation. Maximum Pressure drop for each element is 13 psi. Minimum salt rejection is 96%. Permeate flow for individual elements may vary +/- 20%.



Dimensions inch (mm)

Description	A	B	C	D
NF4 – 2514	14 (355.6)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)
NF4 – 2521	21 (533.4)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)
NF4 – 2540	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	2.4 (60.96)

Description	A	B	C	D
NF4 – 4014	14 (355.6)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
NF4 – 4021	21 (533.4)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)
NF4 – 4040	40 (1016.0)	1.1 (27.94)	0.75 (19.05)	3.95 (100.3)

Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, the manufacturer recommends removing residual free chlorine by pretreatment prior to membrane exposure. Wet tested membrane elements must be kept sealed and moist when in storage. Drying out may occur and damage the membrane permanently. Prevent elements from freezing or being exposed to direct sunlight. Wet tested elements are vacuum sealed in a polyethylene bag containing 1.0% sodium meta-bisulfite and then packaged in a cardboard box. Discard the permeate for the first twenty-four hours of operation. The permeate flow (product water flow) varies with feed water temperature. For membrane warranty information, please contact the manufacturer.

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LC LE-4040-OPTIONAL

Product Information

DOW FILMTEC™ Membranes

Large Commercial 4040 Reverse Osmosis Elements

Features

DOW FILMTEC™ LC 4040 product range are available to meet a wide variety of customer needs in commercial applications, from producing high purity water to delivering low total system costs. Dow's fully automated element production enables the most consistent products in the industry that minimizes the total cost of ownership of water treatment systems.

- LC HR-4040 produces high quality water with our state of the art RO membrane.
- LC LE-4040 delivers high quality water at low pressure at harsh water conditions, using Dow's innovative, proprietary technology for low energy applications.

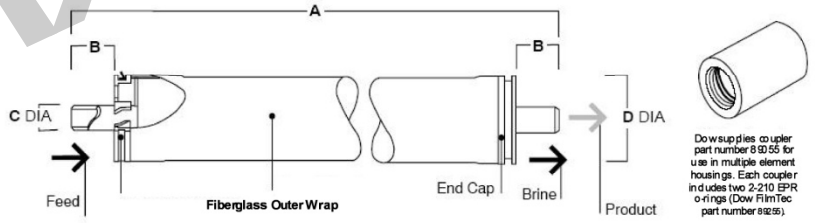
Product Specifications

Product	Part Number Dry (Wet)	Feed Spacer Thickness (mil)	Active Area – ft² (m²)	Permeate Flow Rate gpd (m³/d)	Min. Salt Rejection (%)	Stabilized Salt Rejection (%)
LC HR-4040	343771 / (343770)	28	94 (8.7)	2900 (11)	99.5	99.7
LC LE-4040	356603 / (356602)	28	94 (8.7)	2500 (9.5)	99.1	99.2

1. Permeate flow and salt rejection based on the following test conditions: 2000 ppm NaCl, 77°F (25°C), 15% recovery, pH 8, and applied pressure 225 psig for LC HR and 125 psig for LC LE
2. Permeate flows for individual elements may vary +/-15%.
3. For the purpose of improvement, specifications may be updated periodically.

LC HR-4040	Solute	NH_4^+	NO_3^-	SiO_2	Boron
	Stabilized rejection (%)	98.8	98.2	99.8	80.0

Figure 1



Product	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
LC HR-4040 and LC LE-4040	40.00 (1016)	1.05 (25.7)	0.75 (19)	3.9 (99)

1. Refer to DOW FILMTEC™ Design Guidelines for multiple-element systems
2. LC HR-4040 and LC HRLE-4040 elements fit nominal 4-inch I.D. pressure vessel.

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Operating Limits

Membrane type	Polyamide Thin-Film Composite
Maximum operating temperature[a]	113°F (45°C)
Maximum operating pressure	600 psig (41 bar)
Maximum pressure drop	15 psig (1.0 bar)
Maximum feed flow rate, gpm (m^3/h)	16 gpm (3.6 (m^3/h))
pH range, continuous operation[a]	2 - 11
pH range, short-term cleaning[b]	1 – 13
Maximum Feed Silt Density Index	SDI 5
Free chlorine concentration[c]	< 0.1 ppm

a. Maximum temperature for continuous operation above PH 10 is 95°F (35°C).
b. Refer to Cleaning Guidelines in specification sheet 609-23010.
c. Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine and other oxidants by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

General Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.
Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.
Please refer to the application information literature entitled "Start-Up Sequence" (Form No. 609-02077) for more information.

Operation Guidelines

Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start-up, a gradual change from a standstill to operating state is recommended as follows:

- Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- Permeate obtained from first hour of operation should be discarded.

Important Information

Keep elements moist at all times after initial wetting.
If operating limits and guidelines given in this Product Bulletin are not strictly followed, the limited warranty in Form No. 609-35010 will be null and void.
To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).
Avoid static permeate-side backpressure at all times.

Regulatory Note

These membranes may be subject to drinking water application restrictions in some countries: please check the application status before use and sale.

DOW FILMTEC™ Membranes
For more information about DOW FILMTEC membranes, call the Dow Water & Process Solutions business:
North America: 1-800-447-4369
Latin America: (+55) 11-5188-9222
Europe: (+32) 3-450-2240
Pacific: +60 3 7958 3392
www.dowwaterandprocess.com

Notice: The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.

Notice: No freedom from any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

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LC HR-4040-OPTIONAL

Product Information

DOW FILMTEC™ Membranes

Large Commercial 4040 Reverse Osmosis Elements

Features

DOW FILMTEC™ LC 4040 product range are available to meet a wide variety of customer needs in commercial applications, from producing high purity water to delivering low total system costs. Dow's fully automated element production enables the most consistent products in the industry that minimizes the total cost of ownership of water treatment systems.

- LC HR-4040 produces high quality water with our state of the art RO membrane.
- LC LE-4040 delivers high quality water at low pressure at harsh water conditions, using Dow's innovative, proprietary technology for low energy applications.

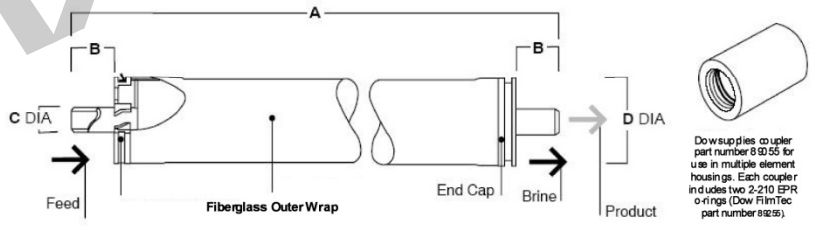
Product Specifications

Product	Part Number Dry (Wet)	Feed Spacer Thickness (mil)	Active Area – ft^2 (m^2)	Permeate Flow Rate gpd (m^3/d)	Min. Salt Rejection (%)	Stabilized Salt Rejection (%)
LC HR-4040	343771 / (343770)	28	94 (8.7)	2900 (11)	99.5	99.7
LC LE-4040	356603 / (356602)	28	94 (8.7)	2500 (9.5)	99.1	99.2

1. Permeate flow and salt rejection based on the following test conditions: 2000 ppm NaCl, 77°F (25°C), 15% recovery, pH 8, and applied pressure 225 psig for LC HR and 125 psig for LC LE
2. Permeate flows for individual elements may vary +/-15%.
3. For the purpose of improvement, specifications may be updated periodically.

LC HR-4040	Solute	NH_4^+	NO_3^-	SiO_2	Boron
	Stabilized rejection (%)	98.8	98.2	99.8	80.0

Figure 1



Product	A Inches (mm)	B Inches (mm)	C Inches (mm)	D Inches (mm)
LC HR-4040 and LC LE-4040	40.00 (1016)	1.05 (25.7)	0.75 (19)	3.9 (99)

1. Refer to DOW FILMTEC™ Design Guidelines for multiple-element systems
2. LC HR-4040 and LC HRLE-4040 elements fit nominal 4-inch I.D. pressure vessel.

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Operating Limits

Membrane type	Polyamide Thin-Film Composite
Maximum operating temperature[a]	113°F (45°C)
Maximum operating pressure	600 psig (41 bar)
Maximum pressure drop	15 psig (1.0 bar)
Maximum feed flow rate, gpm (m^3/h)	16 gpm (3.6 (m^3/h))
pH range, continuous operation[a]	2 - 11
pH range, short-term cleaning[b]	1 – 13
Maximum Feed Silt Density Index	SDI 5
Free chlorine concentration[c]	< 0.1 ppm

a. Maximum temperature for continuous operation above PH 10 is 95°F (35°C).

b. Refer to Cleaning Guidelines in specification sheet 609-23010.

c. Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine and other oxidants by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

General Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.
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M1-4240, M1-6240, M1-8240, M1-10240, M1-12240

SYSTEM IDENTIFICATION

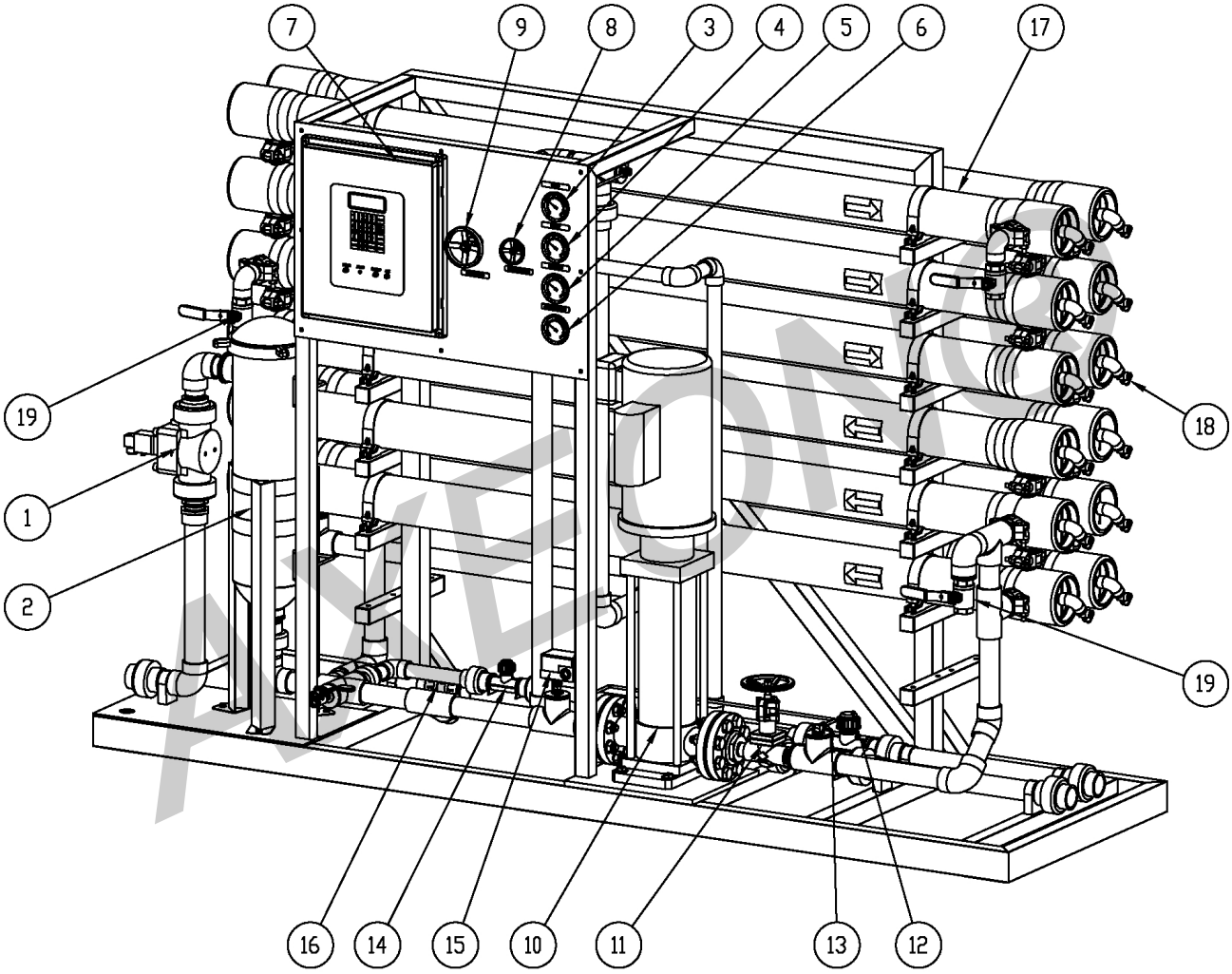

FIGURE 1A

NUMBER IDENTIFICATION

1. **SOLENOID VALVE** – TURNS ON/OFF FEED WATER
2. **5 MICRON SEDIMENT** – REMOVES PARTICULATES
3. **PRESSURE GAUGE** – MEASURES FEED PRESSURE
4. **PRESSURE GAUGE** – MEASURES PRESSURE AFTER FILTERS
5. **PRESSURE GAUGE** – MEASURES PUMP PRESSURE
6. **PRESSURE GAUGE** – MEASURES CONCENTRATE PRESSURE
7. **COMPUTER CONTROL** – CONTROLS RO SYSTEM FUNCTIONS
8. **RECYCLE VALVE** – RECYCLES CONCENTRATE BACK TO FEED (IF APPLICABLE)
9. **CONCENTRATE VALVE**– CONTROLS FLOW OF CONCENTRATE (WASTE) WATER TO THE DRAIN
10. **RO PUMP AND MOTOR** – PRESSURIZES RO SYSTEM
11. **THROTTLE VALVE** – CONTROLS FLOW OF PUMP
12. **FLOW METER** – MEASURES FLOW OF PERMEATE WATER
13. **FLOW METER** – MEASURES FLOW OF CONCENTRATE (WASTE) WATER
14. **FLOW METER** – MEASURES FLOW OF CONCENTRATE RECYCLE WATER
15. **PRESSURE SWITCH** – TURNS OFF RO PUMP WHEN FEED PRESSURE FALLS BELOW 15PSI
16. **PERMEATE CHECK VALVE** – PROTECTS MEMBRANE ELEMENTS FROM BACKPRESSURE
17. **PRESSURE VESSELS** – HOUSES MEMBRANE ELEMENTS
18. **PERMEATE SAMPLE VALVE**- MEASURES THE QUALITY OF EACH MEMBRANE
19. **CLEANING PORT VALVE**- PROVIDES ACCESS TO CLEAN THE MEMBRANES

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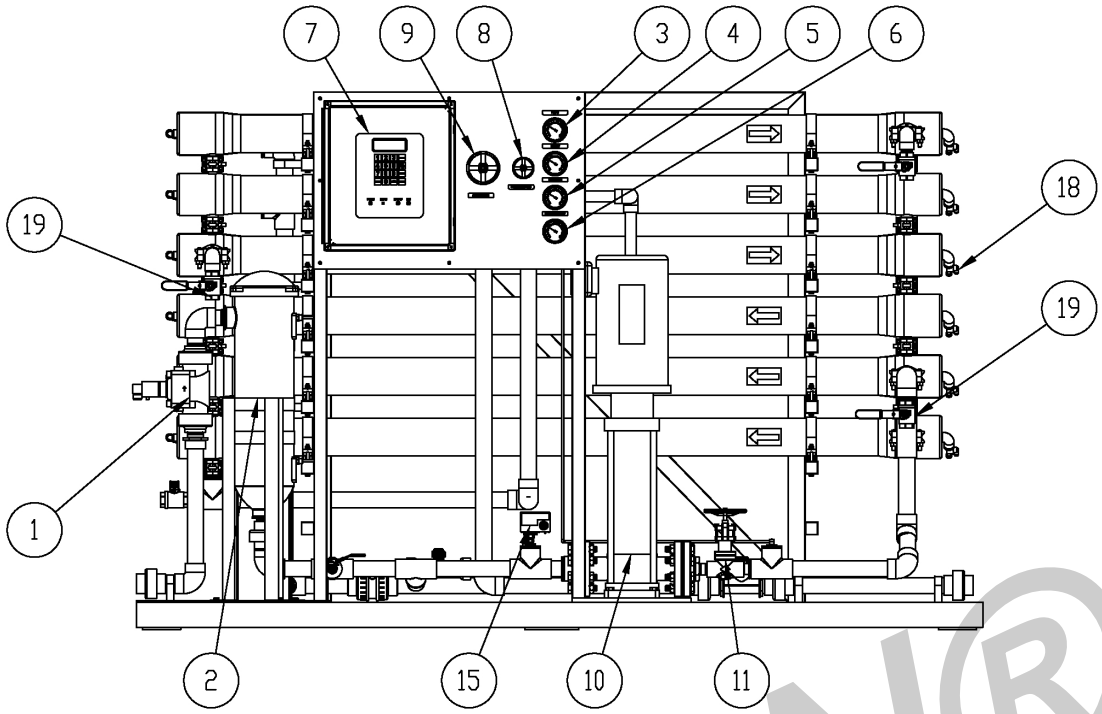

FIGURE 1B

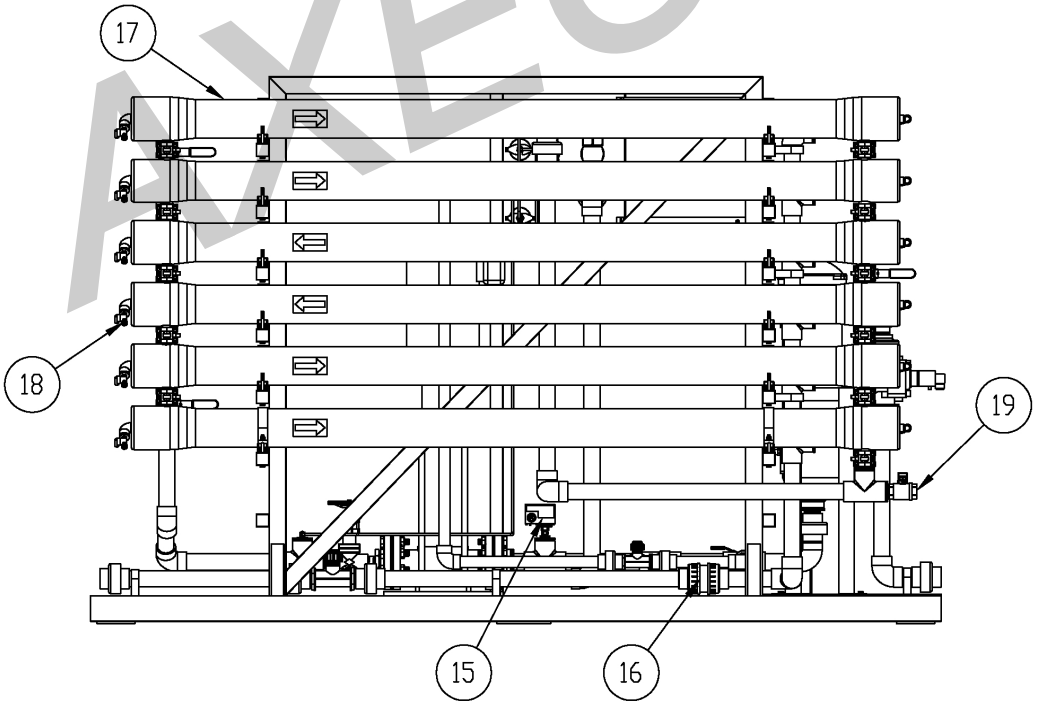

FIGURE 1C

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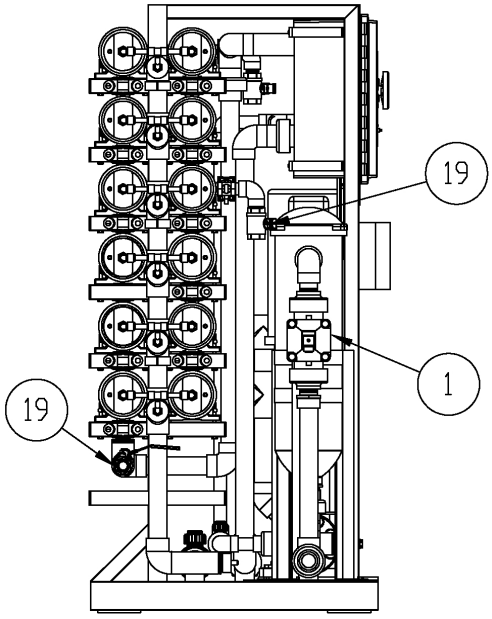
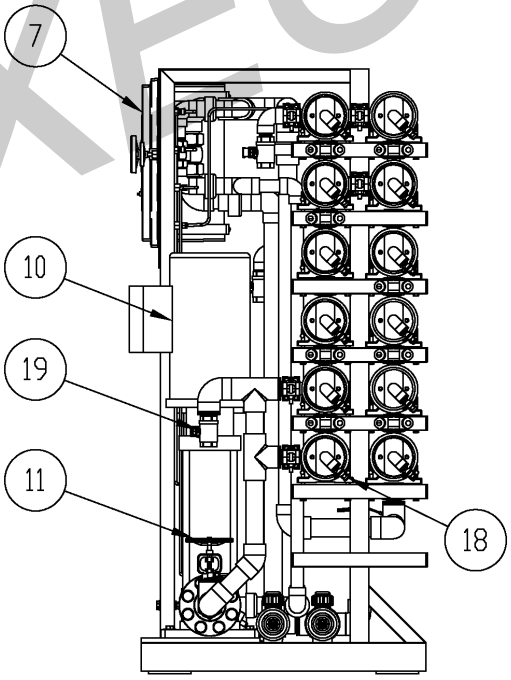


LEFT VIEW

FIGURE 1D



RIGHT VIEW

FIGURE 1E

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SYSTEM PURGING

Carefully inspect your system before initial start-up. Check that all plumbing and electrical connections are not loose or have not come undone during shipment. A User's Manual and Test Results will accompany your M1-Series reverse osmosis system.

NOTE: LEAVE THE POWER TO THE SYSTEM OFF FOR THIS PROCEDURE.

1. Redirect permeate water to the drain for this procedure.
2. Fully open the concentrate valve (Counter Clockwise). (Figure 1B, Page. 19)
3. Fully close the recycle valve (Clockwise) (If Applicable). (Figure 1B, Page. 19)
4. Fully open the throttle valve (Counter Clockwise). (Figure 1B, Page. 19)
5. Press and hold the reset button on the S-150 controller for three seconds to activave the solenoid bypass feature.

Note: Purging procedure with a Rotrol II controller.

1. Redirect permeate water to the drain for this procedure.
2. Fully open the concentrate valve (Counter Clockwise). (Figure 1B, Page. 19)
3. Fully close the recycle valve (Clockwise) (If Applicable). (Figure 1B, Page. 19)
4. Fully open the throttle valve (Counter Clockwise). (Figure 1B, Page. 19)
5. Press the FUCTION key once.
6. Press number 2.
7. Press the ENTER key to initiate a manual flush.

The unit will flush with feed water for 5 minutes. Once the time expires STANDBY will be displayed on the screen.

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INITIAL START-UP

1. Keep the permeate water line to drain for this procedure.
2. Fully open the concentrate valve (Counter Clockwise). (Figure 1B, Page. 19)
3. Fully close the recycle valve (Clockwise)(If Applicable). (Figure 1B, Page. 19)
4. Adjust the throttle valve at 50% open (Counter Clockwise). (Figure 1B, Page. 19)
5. Turn the RO system on and adjust the concentrate (waste) valve, recycle valve (If Applicable), and the throttle valve to the designed flow and pressure. (Figure 1B, Page. 19)
6. Inspect the system for leaks.
7. Allow the system to run 30 minutes to flush the preservative solution from the system.
8. After 30 minutes, shut down the system.
9. Re-direct the permeate water back to the tank and then turn the system back on.
10. Record the readings daily for a week; after one week record the readings once a week.

DESIGN BASIS FOR M1-4240, M1-6240, M1-8240, M1-10240, M1-12240

Specifications

Models	M1-4240	M1-6240	M1-8240	M1-10240	M1-12240
Design					
Configuration	Single Pass	Single Pass	Single Pass	Single Pass	Single Pass
Feed Water Source***	TDS<2,000 ppm	TDS<2,000 ppm	TDS<2,000 ppm	TDS<2,000 ppm	TDS<2,000 ppm
Standard Recovery Rate	50–75%	50–75%	50–75%	50–75%	60–75%
Rejection and Flow Rates					
Nominal Salt Rejection %	99	99	99	99	99
Permeate Flow* gpm (lpm)	8.3 (31.6)	12.5 (47.3)	16.7 (63.1)	20.8 (78.9)	25.0 (94.6)
Minimum Feed Flow gpm (lpm)	11.3 (42.9)	15.5 (58.7)	22.7 (85.8)	26.8 (101.6)	31.0 (117.4)
Maximum Feed Flow gpm (lpm)	48 (181.7)	48 (181.7)	48 (181.7)	48 (181.7)	48 (181.7)
Minimum Concentrate Flow gpm (lpm) with Recycle Based on 75% Recovery	3.00 (11.36)	4.17 (15.79)	5.56 (21.04)	6.95 (26.31)	8.33 (31.53
Connections					
Feed inch	1.5" FNPT	1.5" FNPT	1.5" FNPT	1.5" FNPT	1.5" FNPT
Permeate inch	1" FNPT	1" FNPT	1" FNPT	1.5" FNPT	1.5" FNPT
Concentrate inch	1" FNPT	1" FNPT	1" FNPT	1.5" FNPT	1.5" FNPT
CPI inch	1" FNPT	1" FNPT	1" FNPT	1" FNPT	1" FNPT
Membranes					
Membrane(s) Per Vessel	2	2	2	2	2
Membrane Quantity	8	12	16	20	24
Membrane Size	4040	4040	4040	4040	4040
Vessels					
Vessel Array	1:1:1:1	2:2:1:1	3:3:2	3:3:2:2	3:3:2:2:2
Vessel Quantity	4	6	8	10	12
Pumps					
Pump Type	Multi-Stage	Multi-Stage	Multi-Stage	Multi-Stage	Multi-Stage
Motor HP (kw)	3	3	5	7.5	7.5
RPM @ 60 Hz	3450	3450	3450	3450	3450
RPM @ 50 Hz	VFD at 60Hz	VFD at 60Hz	VFD at 60Hz	VFD at 60Hz	VFD at 60Hz
Electrical					
Standard Voltage	220V, 60Hz, 1Ph, 14.6A	220V, 60Hz, 1Ph, 14.6A	220V, 60Hz, 3Ph, 13.6A	220V, 60Hz, 3Ph, 19.2A	220V, 60Hz, 3Ph, 19.2A
Voltage Options	220V, 50Hz, 1Ph, 17.4A 220V, 50Hz, 3Ph, 10.6A 220V, 60Hz, 3 Ph, 9A 460V, 60Hz, 3 Ph, 5A	220V, 50Hz, 1Ph, 17.4A 220V, 50Hz, 3Ph, 10.6A 220V, 60Hz, 3 Ph, 9A 460V, 60Hz, 3 Ph, 5A	220V, 50Hz, 3Ph, 16.1A 460V, 60Hz, 3 Ph, 7A	220V, 50Hz, 3Ph, 22.9A 460V, 60Hz, 3 Ph, 9.7A	220V, 50Hz, 3Ph, 22.9A 460V, 60Hz, 3 Ph, 9.7A
Systems Dimensions **					
L x W x H inch (cm)	31 x 100 x 64 (78 x 254 x 162)	31 x 100 x 64 (78 x 254 x 162)	31 x 100 x 64 (78 x 254 x 162)	31 x 100 x 64 (78 x 254 x 162)	31 x 100 x 64 (78 x 254 x 162)
Weight lb. (kg)	1060 (481)	1150 (520)	1260 (572)	1350 (612)	1450 (658)

* Product flow and recovery rates are based on equipment test parameters.
†† Standard for all 50Hz Systems
** Does not include operating space requirements.
*** Treatment ability of the RO system is dependent on feed water quality. Performance projections must be run for each installation.

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WARNING: NEVER EXCEED THE SYSTEM'S MAXIMUM PRESSURE RATING

OPERATING DOs AND DON'Ts

DO:

- Change the cartridge filters regularly
- Monitor the system and keep a daily log
- Run the system as much as possible on a continuous basis.
- Adjust the system recovery to the recommended value
- Always feed the pump with filtered water.

DON'T:

- Permit chlorine to enter or be present in the feed water
- Shut down the system for extended periods
- Close the throttle valve completely
- Operate the system with insufficient feed flow
- Operate the pump dry

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OPERATION AND MAINTENANCE

The reverse osmosis process causes the concentration of impurities. The impurities may precipitate (fall out of solution) when their concentration reaches saturation levels.

NOTE: PRECIPITATION CAN SCALE OR FOUL MEMBRANES AND MUST BE PREVENTED.

Check your feed water chemistry and pre-treat the water and/or reduce the system's recovery as required. If necessary, consult with your local dealer or distributor.

PRE-FILTER PRESSURE GAUGES

Pre-filter gauges measure the feed water pressure when it enters and exits the pre-filter. A pressure differential of 10 - 15 psi or more on the two pressure gauges indicates that the pre-filters require servicing.

PUMP PRESSURE AND CONCENTRATE PRESSURE GAUGES

Pump and concentrate gauges measure the pressure of water exiting the multistage pump and the pressure of concentrate water as it exits the pressure vessel array. Comparison of the pump output and concentrate pressures allows for the establishment of a baseline pressure differential. If the pressure differential increases over time from this baseline, it would be an indication that the reverse osmosis membranes need to be inspected.

PERMEATE (PRODUCT) FLOW INDICATOR AND CONCENTRATE (WASTE) FLOW INDICATOR

These digital sensors indicate the flow rates of the permeate and concentrate water. The measurements, when added together, also indicate the feed water flow rate or total flow rate if the recycle valve is not being used. If the recycle valve is being used, add the flow rates for all three flow meters (permeate, concentrate, and recycle) to obtain the total feed flow.

LOW PRESSURE SWITCH

The low pressure switch shuts off the system when the feed water pressure drops below 15 PSI, preventing damage to the pump. The system restarts automatically when there is a constant pressure of 35 PSI or more.

PUMP THROTTLE VALVE

The Pump Throttle Valve is installed as a standard feature on the M1-Series reverse osmosis systems. It provides an adjustment for pump pressure. As the feed water temperature decreases, and/or the feed water TDS increases, the system will require a higher operating pressure to produce the specified permeate flow.

ADJUSTING THE THROTTLE VALVE

To decrease the pressure, turn the handle clockwise. To increase the pressure turn the handle counter clockwise. (Figure 2, Page 24)

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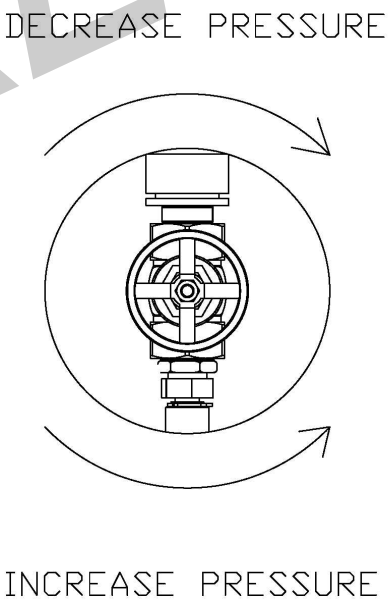

FIGURE 2

MEMBRANE REMOVAL AND REPLACEMENT

Replacing membranes in the pressure vessels is an easy process if you have the proper information and tools at hand. Please refer to the following instructions when removing and replacing membrane elements:

WARNING: ALL PRESSURE GAUGES MUST READ ZERO BEFORE PROCEEDING. BEFORE ATTEMPTING, DISCONNECT THE POWER FROM THE SYSTEM AND BLEED ALL WATER PRESSURE FROM THE SYSTEM.

1. Remove the end plugs from the pressure vessels. This is done by removing the two half-moon retaining disks using a #5 Allen wrench; the end plugs should then freely slide out of the pressure vessel.

2. Remove the replacement membrane element(s) from the shipping box; the membrane(s) should be contained within a plastic oxygen barrier bag.

NOTE: WEAR GLOVES FOR THE FOLLOWING STEPS IN ORDER NOT TO CONTAMINATE THE MEMBRANE.

3. Cut the bag open as close as possible to the seal at one end of the bag, so the bag may be re-used if necessary.

4. Make sure that all parts are clean and free from dirt. Examine the brine seal, and permeate tube for nicks or cuts. Replace the O-rings or brine seal if damaged.

5. Flow directions should be observed for installation of each element into their respective pressure vessels.

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REPLACING THE MEMBRANE ELEMENT:

WARNING: THE BRINE SEAL MUST BE IN THE SAME POSITION FOR EACH MEMBRANE ELEMENT HOUSING, SO MARK EACH HOUSING PRIOR TO REMOVING THE MEMBRANE ELEMENTS. THE BRINE SEAL IS A RUBBER SEAL THAT PROTRUDES ON ONE SIDE OF THE MEMBRANE AND IS ALWAYS ON THE FEED SIDE OF THE MEMBRANE ELEMENT.

1. Remove one membrane element at a time from the pressure vessels. Long nose pliers may be necessary to pull the old membrane element out of the membrane element housing.

2. Lubricate the brine seal with a non-petroleum based lubricant, such as Dow Corning® 111.

3. Install membranes with brine seal facing towards the flow arrow.

4. For brine seals that are facing the flow arrow: At a slight angle insert the membrane while slightly rotating the element being careful not to tear or flip the brine seal. A slow twisting motion should be used to insert the membrane element, for every couple of turns pull up ½" to make sure the brine seal doesn't flip.

5. With a smooth and constant motion, push the membrane element into the housing so the brine seal enters the housing without coming out of the brine seal groove.

6. Re-install the end plugs by gently twisting the end cap while pushing it onto the housing. Ensure that you do not pinch or fatigue any O-rings while re-installing the end plug. Push the end plug on until the outer diameter of the plug is flush with the outer diameter of the pressure vessel.

7. Insert the two half-moon retaining disks until they are fully seated. Subsequently fasten using a #5 Allen wrench.

8. Reconnect any fittings that may have been disconnected when the membrane pressure vessels were disassembled.

9. To Start-Up the system, please refer to the Initial Start-Up section of this manual. (See page 21)

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CAUTION: WET MEMBRANES ARE SHIPPED IN A PRESERVATIVE SOLUTION. THE MEMBRANES MUST BE FLUSHED FOR AT LEAST 30 MINUTES TO REMOVE THE PRESERVATIVE FROM THE MEMBRANE. DISCARD ALL OF THE PERMEATE, WHICH IS PRODUCED DURING THE FLUSH PERIOD.

FLUSHING THE SYSTEM

The system should be flushed weekly to remove sediment from the surface of the membranes. To manually flush the system, follow the preceding steps:

1. The system must be operating during the flush procedure.
2. Fully open the concentrate valve. (Figure 1B, Page. 19)
3. Allow the system to run for 10 to 20 minutes.
4. After 10 to 20 minutes, close the concentrate valve to its previous setting. Ensure the proper concentrate flow rate is going to the drain.
5. The system is now ready to operate.

PREPARING UNIT FOR STORAGE OR SHIPMENT

PRIOR TO SHIPPING OR STORING YOUR SYSTEM, THE SYSTEM SHOULD BE CLEANED WITH AN APPROPRIATE CLEANER, FLUSHED WITH WATER, AND PROTECTED FROM BIOLOGICAL ATTACK WITH AN APPROPRIATE SOLUTION FOR MEMBRANE ELEMENTS. THE MEMBRANE HOUSING(S) AND PLUMBING LINES OF THE SYSTEM MUST BE COMPLETELY DRAINED. ANY WATER REMAINING IN THE PLUMBING OF A SYSTEM MAY FREEZE, CAUSING SERIOUS DAMAGE.

PREPARING SYSTEM FOR STORAGE:

1. Totally immerse the elements in the membrane housing in a solution of 2% membrane preservative, venting the air outside of the pressure vessels. Use the overflow technique: circulate the Memstor solution in such a way that the remaining air in the system is minimized after the recirculation is completed. After the pressure vessel is filled, the Memstor solution should be allowed to overflow through an opening located higher than the upper end of the highest pressure vessel being filled.
2. Separate the preservation solution from the air outside by closing all valves.
3. Repeat this process at least once a month.

During the shutdown period, the plant must be kept frost-free, or the temperature must not exceed 113°F (45°C).

PREPARING UNIT FOR SHIPMENT:

4. Disconnect the inlet, concentrate, pre-filter, and permeate plumbing.
5. Drain all water from the pre-filter cartridge housings by unscrewing the housings, removing the pre-filter cartridges, and drain the water from the housings.
6. Disconnect the tubing from the connectors on the permeate and concentrate inlets and outlets.

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7. Fully open the concentrate valve.
8. Drain the flow meters.
9. Allow the system to drain for a minimum of eight hours or until the opened ports quit dripping.
10. After draining is complete, reconnect all of the plumbing.

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REVERSE OSMOSIS TROUBLESHOOTING

SYMPTOMS	POSSIBLE CAUSES	CORRECTIVE ACTION
LOW INLET PRESSURE	Low supply pressure	Increase Inlet Pressure
	Cartridge filters plugged	Change Filters
	Solenoid valve malfunction	Replace Sol. Valve and/or Coil
	Concentrate valve might be damaged	Replace Needle Valve
	Leaks	Fix any visible leaks
LOW PERMEATE FLOW	Cold feed water	See temperature correction sheet
	Low operating pressure	See low inlet pressure
	Defective membrane brine seal/ Membrane installed backwards	Replace brine seal and / or Reposition membranes
	Fouled or Scaled membrane	Clean membranes
	Damaged product tube o-rings	Inspect and/or replace
HIGH PERMEATE FLOW	Damaged or oxidized membrane	Replace membrane
	Exceeding maximum feed water temperature	See temperature correction sheet
	Low operating pressure	Adjust concentrate valve
POOR PERMEATE QUALITY	Damage product tube o-rings	Inspect and/or replace
	Damaged or oxidized membrane	Replace membrane
	Metal Oxide Fouling	Improve pretreatment to remove metals. Clean with Acid Cleaners.
MEMBRANE FOULING	Colloidal Fouling	Optimize pretreatment for colloid removal. Clean with high pH anionic cleaners.
	Scaling (CaSO4, CaSO3, BaSO4, SiO2)	Increase acid addition and antiscalant dosage for CaVO3 and CaCO4. Reduce recovery. Clean with Acid Cleaners
	Biological Fouling	Shock dosage of Sodium Bi-Sulfate. Continuous feed of Sodium Bi-Sulfate at reduced pH. Chlorination and de-chlorination. Replace cartridge filters.
	Organic Fouling	Activated Carbon or other pretreatment. Clean with high pH cleaner.
	Chlorine Oxidation	Check Chlorine feed equipment and de-chlorination system.
	Abrasion of membrane by Crystalline Material	Improve pretreatment. Check all filters for media leakage.

AXEON®

ABNORMAL PERMEATE FLOW

As time progresses, the efficiency of the membrane will be reduced. In general, the salt rejection does not change significantly until two or three years after installation when operated on properly pretreated feed water. The permeate flow rate will begin to decline slightly after one year of operation, but can be extended with diligent flushing and cleaning of the system. A high pH and/or precipitation of hardness can cause premature loss in rejection.

Permeate flow should be within 20% of the rated production, after correcting the feed water temperatures above or below 77°F. Check your permeate flow meter to determine the permeate flow rate.

NOTE: TO DETERMINE THE TEMPERATURE CORRECTION FACTOR, LOCATE THE TEMPERATURE CORRECTION TABLE IN THIS USER'S MANUAL AND FOLLOW THE DIRECTIONS

AXEON®

TEMPERATURE CORRECTION FACTORS FOR MEMBRANE

Find the temperature correction factor (TCF) from the table below. Divide the rated permeate flow at 77°F by the temperature correction factor. The result is the permeate flow at the desired temperature. (See example on the next page)

Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor	Temperature °F (°C)	Temperature Correction Factor
50.0 (10.0)	1.711	57.2 (14.0)	1.475	64.4 (18.0)	1.276	71.6 (22.0)	1.109	78.8 (26.0)	0.971
50.2 (10.1)	1.705	57.4 (14.1)	1.469	64.6 (18.1)	1.272	71.8 (22.1)	1.105	79.0 (26.1)	0.968
50.4 (10.2)	1.698	57.6 (14.2)	1.464	64.8 (18.2)	1.267	72.0 (22.2)	1.101	79.2 (26.2)	0.965
50.5 (10.3)	1.692	57.7 (14.3)	1.459	64.9 (18.3)	1.262	72.1 (22.3)	1.097	79.3 (26.3)	0.962
50.7 (10.4)	1.686	57.9 (14.4)	1.453	65.1 (18.4)	1.258	72.3 (22.4)	1.093	79.5 (26.4)	0.959
50.9 (10.5)	1.679	58.1 (14.5)	1.448	65.3 (18.5)	1.254	72.5 (22.5)	1.090	79.7 (26.5)	0.957
51.1 (10.6)	1.673	58.3 (14.6)	1.443	65.5 (18.6)	1.249	72.7 (22.6)	1.086	79.9 (26.6)	0.954
51.3 (10.7)	1.667	58.5 (14.7)	1.437	65.7 (18.7)	1.245	72.9 (22.7)	1.082	80.1 (26.7)	0.951
51.4 (10.8)	1.660	58.6 (14.8)	1.432	65.8 (18.8)	1.240	73.0 (22.8)	1.078	80.2 (26.8)	0.948
51.6 (10.9)	1.654	58.8 (14.9)	1.427	66.0 (18.9)	1.236	73.2 (22.9)	1.075	80.4 (26.9)	0.945
51.8 (11.0)	1.648	59.0 (15.0)	1.422	66.2 (19.0)	1.232	73.4 (23.0)	1.071	80.6 (27.0)	0.943
52.0 (11.1)	1.642	59.2 (15.1)	1.417	66.4 (19.1)	1.227	73.6 (23.1)	1.067	80.8 (27.1)	0.940
52.2 (11.2)	1.636	59.4 (15.2)	1.411	66.6 (19.2)	1.223	73.8 (23.2)	1.064	81.0 (27.2)	0.937
52.3 (11.3)	1.630	59.5 (15.3)	1.406	66.7 (19.3)	1.219	73.9 (23.3)	1.060	81.1 (27.3)	0.934
52.5 (11.4)	1.624	59.7 (15.4)	1.401	66.9 (19.4)	1.214	74.1 (23.4)	1.056	81.3 (27.4)	0.932
52.7 (11.5)	1.618	59.9 (15.5)	1.396	67.1 (19.5)	1.210	74.3 (23.5)	1.053	81.5 (27.5)	0.929
52.9 (11.6)	1.611	60.1 (15.6)	1.391	67.3 (19.6)	1.206	74.5 (23.6)	1.049	81.7 (27.6)	0.926
53.1 (11.7)	1.605	60.3 (15.7)	1.386	67.5 (19.7)	1.201	74.7 (23.7)	1.045	81.9 (27.7)	0.924
53.2 (11.8)	1.600	60.4 (15.8)	1.381	67.6 (19.8)	1.197	74.8 (23.8)	1.042	82.0 (27.8)	0.921
53.4 (11.9)	1.594	60.6 (15.9)	1.376	67.8 (19.9)	1.193	75.0 (23.9)	1.038	82.2 (27.9)	0.918
53.6 (12.0)	1.588	60.8 (16.0)	1.371	68.0 (20.0)	1.189	75.2 (24.0)	1.035	82.4 (28.0)	0.915
53.8 (12.1)	1.582	61.0 (16.1)	1.366	68.2 (20.1)	1.185	75.4 (24.1)	1.031	82.6 (28.1)	0.913
54.0 (12.2)	1.576	61.2 (16.2)	1.361	68.4 (20.2)	1.180	75.6 (24.2)	1.028	82.8 (28.2)	0.910
54.1 (12.3)	1.570	61.3 (16.3)	1.356	68.5 (20.3)	1.176	75.7 (24.3)	1.024	82.9 (28.3)	0.908
54.3 (12.4)	1.564	61.5 (16.4)	1.351	68.7 (20.4)	1.172	75.9 (24.4)	1.021	83.1 (28.4)	0.905
54.5 (12.5)	1.558	61.7 (16.5)	1.347	68.9 (20.5)	1.168	76.1 (24.5)	1.017	83.3 (28.5)	0.902
54.7 (12.6)	1.553	61.9 (16.6)	1.342	69.1 (20.6)	1.164	76.3 (24.6)	1.014	83.5 (28.6)	0.900
54.9 (12.7)	1.547	62.1 (16.7)	1.337	69.3 (20.7)	1.160	76.5 (24.7)	1.010	83.7 (28.7)	0.897
55.0 (12.8)	1.541	62.2 (16.8)	1.332	69.4 (20.8)	1.156	76.6 (24.8)	1.007	83.8 (28.8)	0.894
55.2 (12.9)	1.536	62.4 (16.9)	1.327	69.6 (20.9)	1.152	76.8 (24.9)	1.003	84.0 (28.9)	0.892
55.4 (13.0)	1.530	62.6 (17.0)	1.323	69.8 (21.0)	1.148	77.0 (25.0)	1.000	84.2 (29.0)	0.889
55.6 (13.1)	1.524	62.8 (17.1)	1.318	70.0 (21.1)	1.144	77.2 (25.1)	0.997	84.4 (29.1)	0.887
55.8 (13.2)	1.519	63.0 (17.2)	1.313	70.2 (21.2)	1.140	77.4 (25.2)	0.994	84.6 (29.2)	0.884
55.9 (13.3)	1.513	63.1 (17.3)	1.308	70.3 (21.3)	1.136	77.5 (25.3)	0.991	84.7 (29.3)	0.882
56.1 (13.4)	1.508	63.3 (17.4)	1.304	70.5 (21.4)	1.132	77.7 (25.4)	0.988	84.9 (29.4)	0.879
56.3 (13.5)	1.502	63.5 (17.5)	1.299	70.7 (21.5)	1.128	77.9 (25.5)	0.985	85.1 (29.5)	0.877
56.5 (13.6)	1.496	63.7 (17.6)	1.294	70.9 (21.6)	1.124	78.1 (25.6)	0.982	85.3 (29.6)	0.874
56.7 (13.7)	1.491	63.9 (17.7)	1.290	71.1 (21.7)	1.120	78.3 (25.7)	0.979	85.5 (29.7)	0.871
56.8 (13.8)	1.486	64.0 (17.8)	1.285	71.2 (21.8)	1.116	78.4 (25.8)	0.977	85.6 (29.8)	0.869
57.0 (13.9)	1.480	64.2 (17.9)	1.281	71.4 (21.9)	1.112	78.6 (25.9)	0.974	85.8 (29.9)	0.866

°F = (°C x 9/5) + 32

Corrected Flow Rate = (Measured Flow Rate)*(TCF @ Feed Water Temp.)

AXEON

If a system is rated to produce 5 gpm of permeate water @ 77˚ F. The same system will produce more water at a higher temperature. It will also produce less water at a lower temperature. Use the temperature correction table to obtain the correct flow.

Example:

5 gpm @ 59˚ F (5÷1.42=3.52 gpm)

5 gpm @ 77˚ F (5÷1=5 gpm)

5 gpm @ 84˚ F (5÷0.89=5.62 gpm)

SERVICE ASSISTANCE

If service assistance is required, please complete the following process:

Contact your local dealer or distributor. Prior to making the call, have the following information available: system installation date, serial number, daily log sheets, current operating parameters (e.g. flow, operating pressures, pH, etc.), and a detailed description of the problem.

\

AXEON®

OPERATION

Company: _____

Location: _____

Week Of: _____

System Serial #: _____

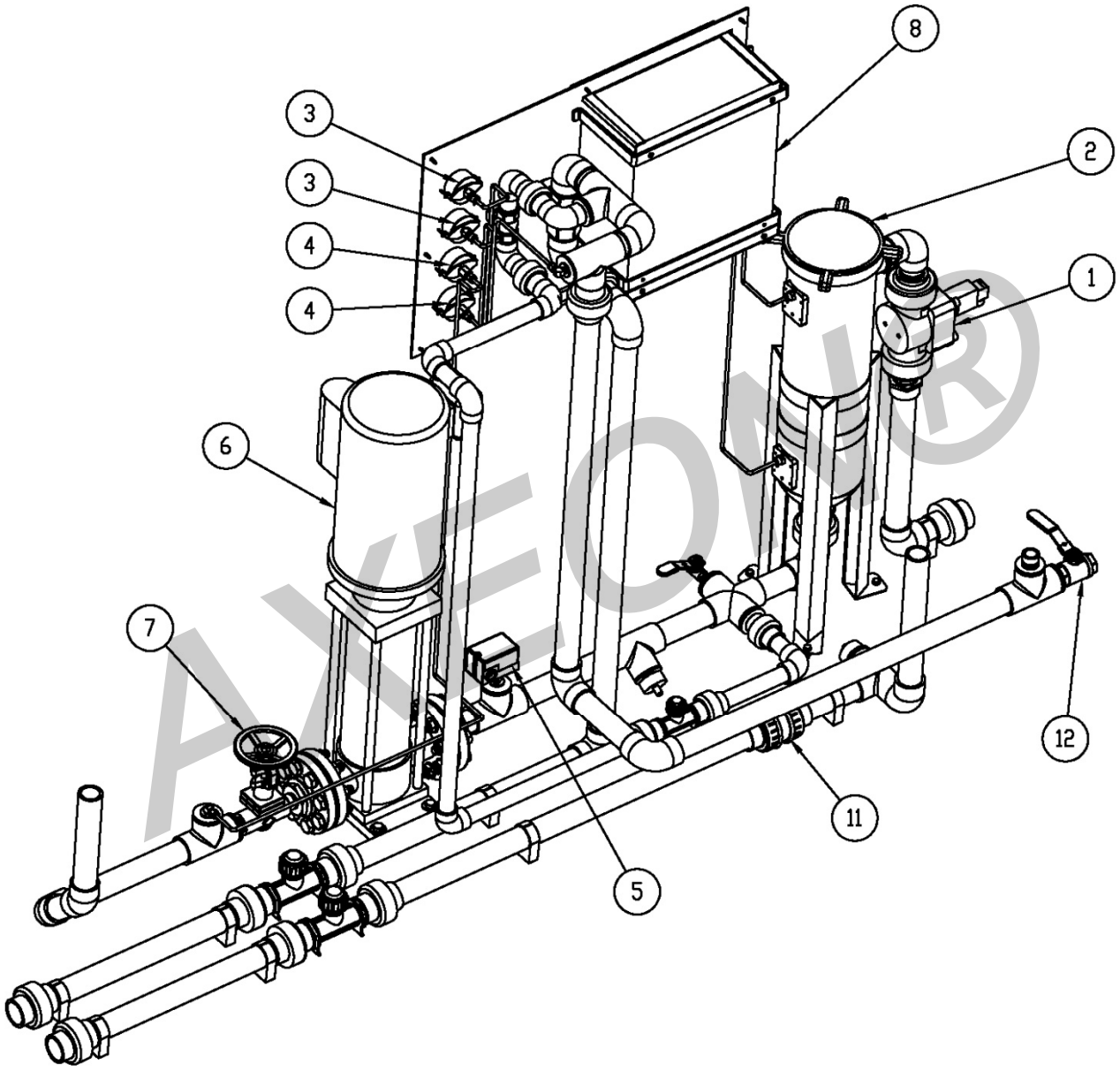
Date of Start-Up: _____

Date of Last Cleaning: _____

DATE					
TIME					
HOUR OF OPERATION					
FILTER INLET PRESSURE (PSI)					
FILTER OUTLET PRESSURE (PSI)					
CONCENTRATE PRESSURE (PSI)					
PUMP DISCHARGE PRESSURE (PSI)					
FEED FLOW (GPM)					
PERMEATE FLOW (GPM)					
CONCENTRATE FLOW (GPM)					
RECYCLE FLOW (GPM)					
RECOVERY %					
FEED TEMPERATURE					
FEED TDS (PPM)					
PERMEATE TDS (PPM)					
REJECTION %					
FEED PH					
PERMEATE PH					
SCALE INHIBITOR FEED (PPM)					
IRON (mg/L)					
FREE CHLORINE (mg/L)					
HARDNESS (GPG $CaCO_3$)					

AXEON®

DRAWINGS



M1-12240 Pictured

FIGURE 3

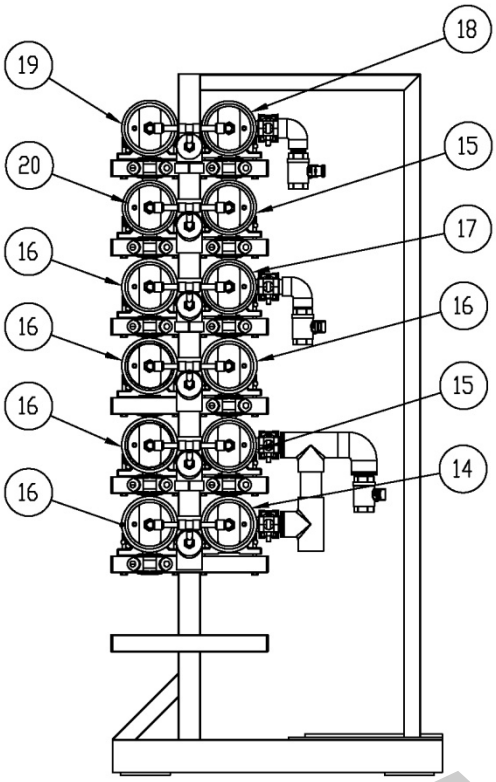
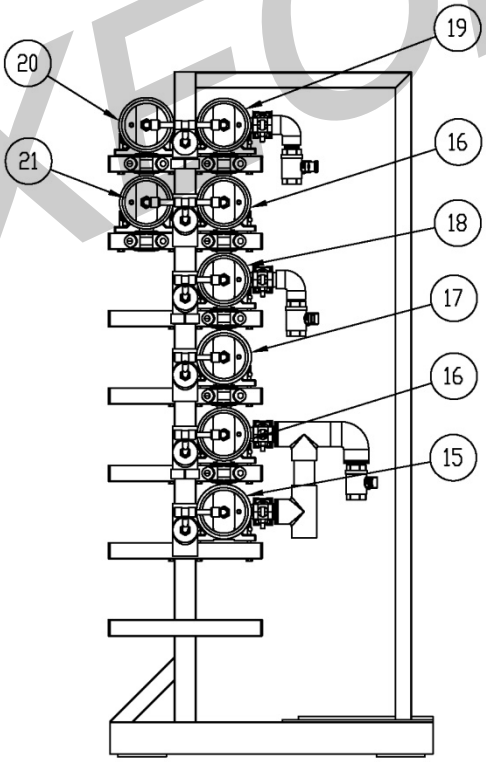


FIGURE 4

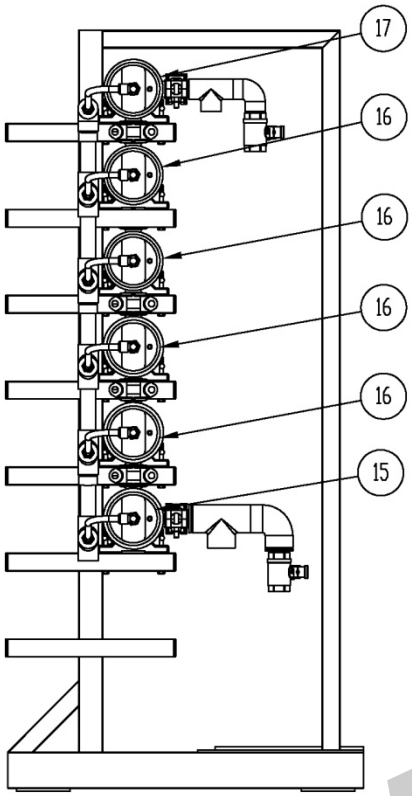
Vessel Part List for 10240 and 12240



Vessel Part List for 8240

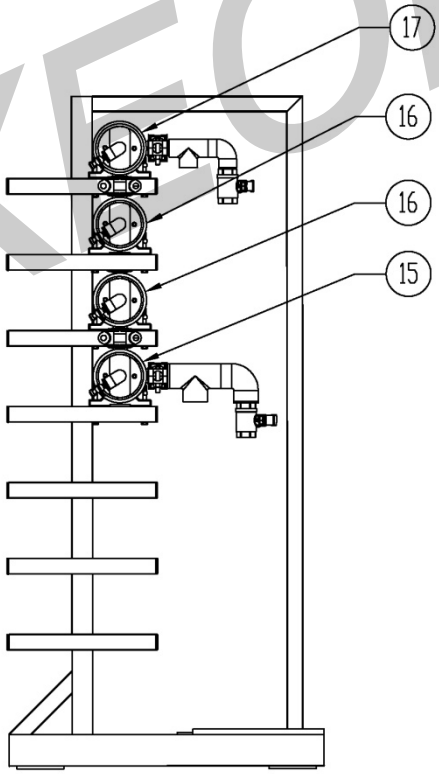
FIGURE 5

AXEON®



Vessel Part List for 6240

FIGURE 6



Vessel Part List for 4240

FIGURE 7

AXEON®

M1-4240 SYSTEM PART LIST

Item No.	Quantity	Part Number	Description
1	1	206548	VALVE, SOLENOID, N/C, PVC, 220V, 1-1/2" FNPT, BURKERT
2	1	200709	CARTRIDGE, FILTER, BAG, 18", 5 MIC, FSI
3	2	204165	GAUGE, BKM, GLY FILL, 0-100 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
4	2	200904	GAUGE, BKM, GLY FILL, 0-300 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
5	1	200906	SWITCH, PRESSURE, LOW, N/O, 15-30 PSI, 1/4" FNPT
6	1	206418	PUMP, MULTISTAGE, 3HP,115/208-230V,1PH,TEFC,5SV10FA30/V09722
7	1	205903	VALVE, GLOBE, SS, 1" FNPT, 800 LB.
8	1	206537	CONTROLLER, COMPUTER, ROTROL S-150, 220V, 3PH, 3HP, 14" X 12"
9	2	200994	VALVE, GLOBE, SS, 3/4" FNPT
10	2	200900	METER, FLOW, PM, 2-20 GPM, 1" MNPT x 1" MNPT, AXEON
11	1	200898	METER, FLOW, PM, 1-5 GPM, 1/2" MNPT x 1/2" MNPT, AXEON
12	1	206545	VALVE, CHECK, BALL, PVC, 1" X 1" SLIP/FNPT, HAYWARD
13	2	205780	VALVE, BALL, REDUCED PORT, 1" FNPT, 316SS
14	8	200391	MEMBRANE, HF4, 4040, DRY, AXEON
15	1	205576	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-145, ROPV
16	2	205577	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-157, ROPV
17	1	205579	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-347, ROPV

AXEON

M1-6240 SYSTEM PART LIST

Item No.	Quantity	Part Number	Description
1	1	206548	VALVE, SOLENOID, N/C, PVC, 220V, 1-1/2" FNPT, BURKERT
2	1	200709	CARTRIDGE, FILTER, BAG, 18", 5 MIC, FSI
3	2	204165	GAUGE, BKM, GLY FILL, 0-100 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
4	2	200904	GAUGE, BKM, GLY FILL, 0-300 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
5	1	200906	SWITCH, PRESSURE, LOW, N/O, 15-30 PSI, 1/4" FNPT
6	1	206418	PUMP, MULTISTAGE, 3HP,115/208-230V,1PH,TEFC,5SV10FA30/V09722
7	1	205903	VALVE, GLOBE, SS, 1" FNPT, 800 LB.
8	1	206537	CONTROLLER, COMPUTER, ROTROL S-150, 220V, 3PH, 3HP, 14" X 12"
9	2	200994	VALVE, GLOBE, SS, 3/4" FNPT
10	2	200900	METER, FLOW, PM, 2-20 GPM, 1" MNPT x 1" MNPT, AXEON
11	1	200898	METER, FLOW, PM, 1-5 GPM, 1/2" MNPT x 1/2" MNPT, AXEON
12	1	206545	VALVE, CHECK, BALL, PVC, 1" X 1" SLIP/FNPT, HAYWARD
13	2	205780	VALVE, BALL, REDUCED PORT, 1" FNPT, 316SS
14	12	200391	MEMBRANE, HF4, 4040, DRY, AXEON
15	1	205576	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-145, ROPV
16	4	205577	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-157, ROPV
17	1	205581	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-378, ROPV

AXEON

M1-8240 SYSTEM PART LIST

Item No.	Quantity	Part Number	Description
1	1	206548	VALVE, SOLENOID, N/C, PVC, 220V, 1-1/2" FNPT, BURKERT
2	1	200709	CARTRIDGE, FILTER, BAG, 18", 5 MIC, FSI
3	2	204165	GAUGE, BKM, GLY FILL, 0-100 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
4	2	200904	GAUGE, BKM, GLY FILL, 0-300 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
5	1	200906	SWITCH, PRESSURE, LOW, N/O, 15-30 PSI, 1/4" FNPT
6	1	206417	PUMP, MULTISTAGE, 5HP,208-230/460V,3HP,TEFC,5SV10FB30/V10742A
7	1	205903	VALVE, GLOBE, SS, 1" FNPT, 800 LB.
8	1	203263	CONTROLLER, COMPUTER, ROTROL S-150, 220V, 3PH, 5 HP
9	2	200994	VALVE, GLOBE, SS, 3/4" FNPT
10	2	200900	METER, FLOW, PM, 2-20 GPM, 1" MNPT x 1" MNPT, AXEON
11	1	200898	METER, FLOW, PM, 1-5 GPM, 1/2" MNPT x 1/2" MNPT, AXEON
12	2	206545	VALVE, CHECK, BALL, PVC, 1" X 1" SLIP/FNPT, HAYWARD
13	4	205780	VALVE, BALL, REDUCED PORT, 1" FNPT, 316SS
14	16	200391	MEMBRANE, HF4, 4040, DRY, AXEON
15	1	205576	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-145, ROPV
16	2	205586	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-12357, ROPV
17	1	205577	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-157, ROPV
18	1	205583	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-1578, ROPV
19	1	205584	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-2347, ROPV
20	1	205579	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-347, ROPV
21	1	205582	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-1457, ROPV

AXEON

M1-10240 SYSTEM PART LIST

Item No.	Quantity	Part Number	Description
1	1	206548	VALVE, SOLENOID, N/C, PVC, 220V, 1-1/2" FNPT, BURKERT
2	1	200709	CARTRIDGE, FILTER, BAG, 18", 5 MIC, FSI
3	2	204165	GAUGE, BKM, GLY FILL, 0-100 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
4	2	200904	GAUGE, BKM, GLY FILL, 0-300 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
5	1	200906	SWITCH, PRESSURE, LOW, N/O, 15-30 PSI, 1/4" FNPT
6	1	206419	PUMP, MULTISTAGE, 7.5HP,208-230/460V,3PH,TEFC,10SV8FB30/V11742A
7	1	205903	VALVE, GLOBE, SS, 1" FNPT, 800 LB.
8	1	206651	CONTROLLER, COMPUTER, ROTROL II, 220V, 3 PH, 7.5HP, 16 X 14 BOX
9	1	200996	VALVE, GLOBE, SS, 1-1/2" FNPT
10	1	200995	VALVE, GLOBE, SS, 1" FNPT
11	1	206539	VALVE, CHECK, BALL, PVC, 1-1/2" X 1-1/2" SLIP/FNPT, HAYWARD
12	4	205780	VALVE, BALL, REDUCED PORT, 1" FNPT, 316SS
13	20	200391	MEMBRANE, HF4, 4040, DRY, AXEON
14	1	205576	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-145, ROPV
15	2	205586	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-12357, ROPV
16	3	205577	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-157, ROPV
17	1	205583	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-1578, ROPV
18	1	205584	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-2347, ROPV
19	1	205579	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-347, ROPV
20	1	205582	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-1457, ROPV

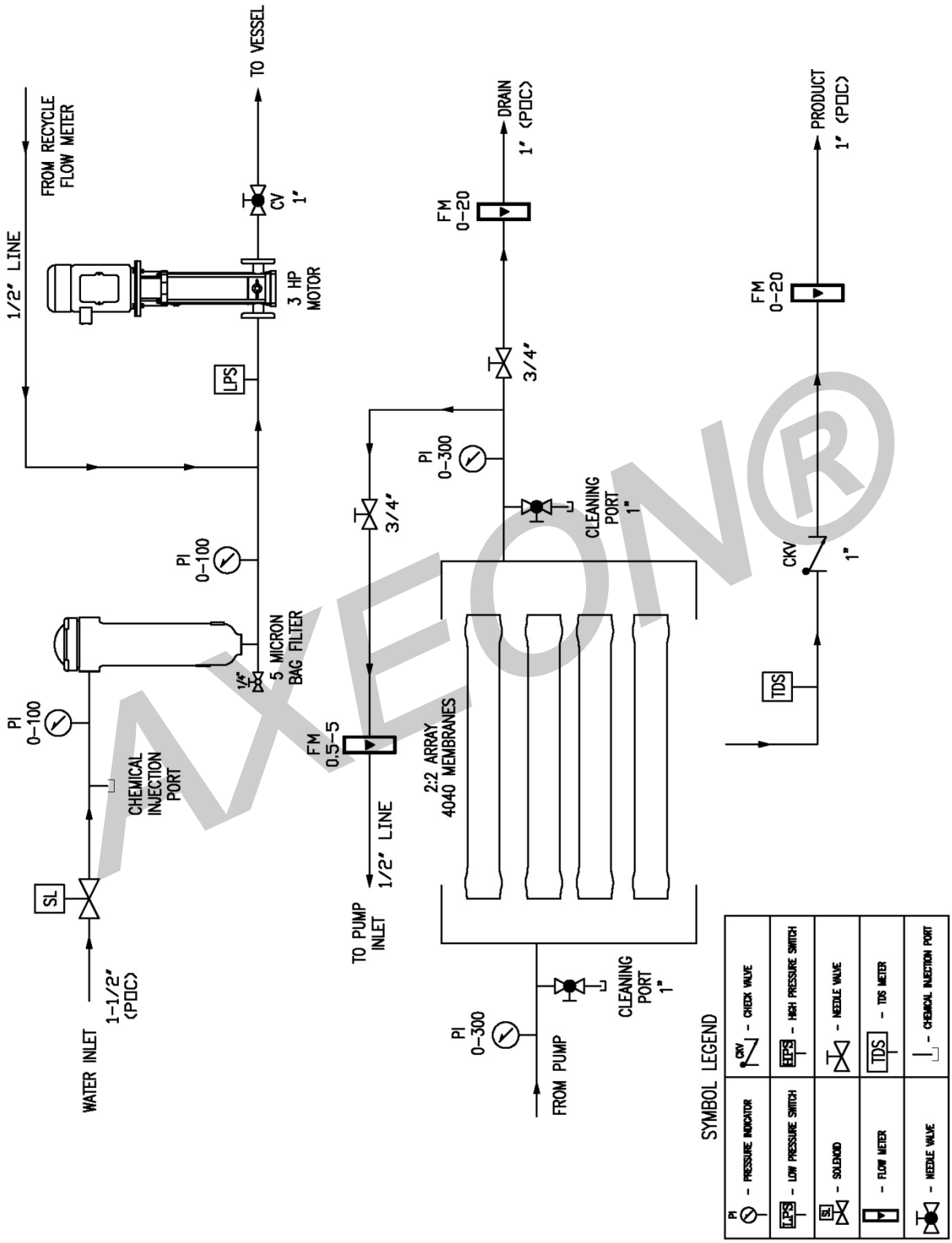
AXEON

M1-12240 SYSTEM PART LIST

Item No.	Quantity	Part Number	Description
1	1	206548	VALVE, SOLENOID, N/C, PVC, 220V, 1-1/2" FNPT, BURKERT
2	1	200709	CARTRIDGE, FILTER, BAG, 18", 5 MIC, FSI
3	2	204165	GAUGE, BKM, GLY FILL, 0-100 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
4	2	200904	GAUGE, BKM, GLY FILL, 0-300 PSI/BAR, 2.5" DIA, 1/4" MNPT, AXEON
5	1	200906	SWITCH, PRESSURE, LOW, N/O, 15-30 PSI, 1/4" FNPT
6	1	206419	PUMP, MULTISTAGE, 7.5HP,208-230/460V,3PH,TEFC,10SV8FB30/V11742A
7	1	205903	VALVE, GLOBE, SS, 1" FNPT, 800 LB.
8	1	206651	CONTROLLER, COMPUTER, ROTROL II, 220V, 3 PH, 7.5HP, 16 X 14 BOX
9	1	200996	VALVE, GLOBE, SS, 1-1/2" FNPT
10	1	200995	VALVE, GLOBE, SS, 1" FNPT
11	1	206539	VALVE, CHECK, BALL, PVC, 1-1/2" X 1-1/2" SLIP/FNPT, HAYWARD
12	4	205780	VALVE, BALL, REDUCED PORT, 1" FNPT, 316SS
13	20	200391	MEMBRANE, HF4, 4040, DRY, AXEON
14	1	205576	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-145, ROPV
15	2	205586	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-12357, ROPV
16	5	205577	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-157, ROPV
17	1	205583	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-1578, ROPV
18	1	205584	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-2347, ROPV
19	1	205579	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-347, ROPV
20	1	205582	HOUSING, MEMBRANE, 450PSI, FRP, 4080, 1" VICTAULIC, P-1457, ROPV

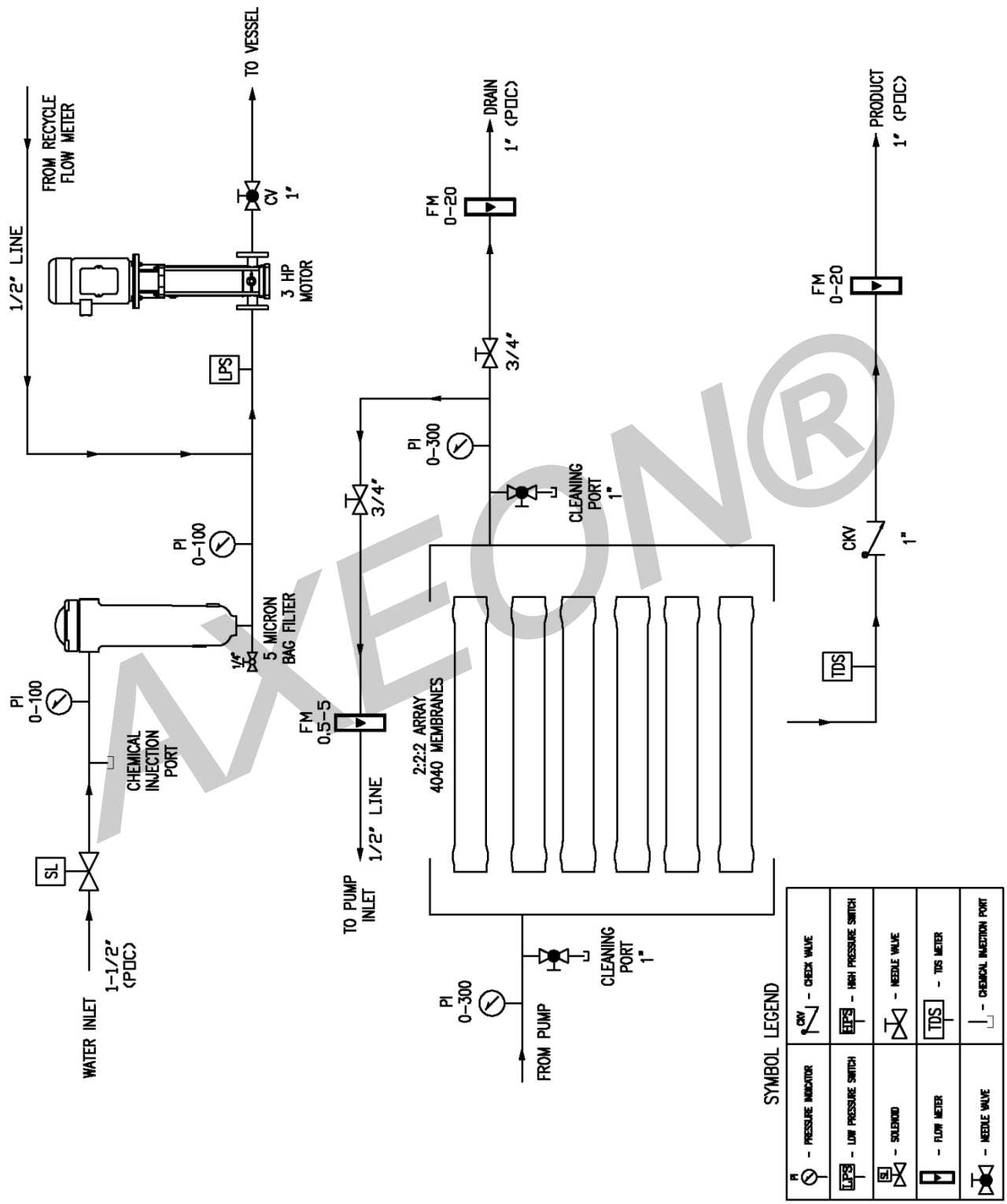
AXEON

M1-4240 FLOW DIAGRAM



AXEON®

M1-6240 FLOW DIAGRAM



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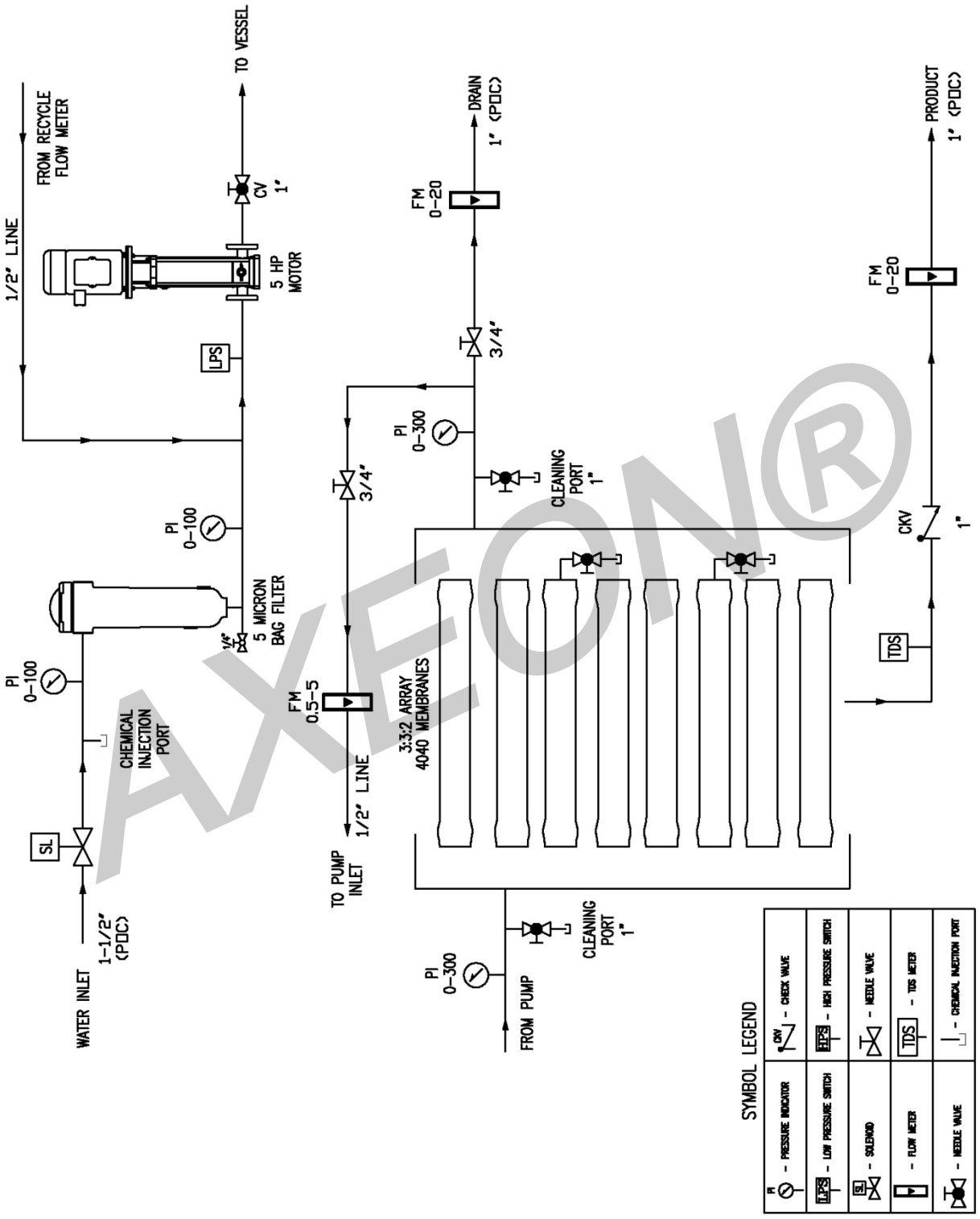
M1-8240 FLOW DIAGRAM



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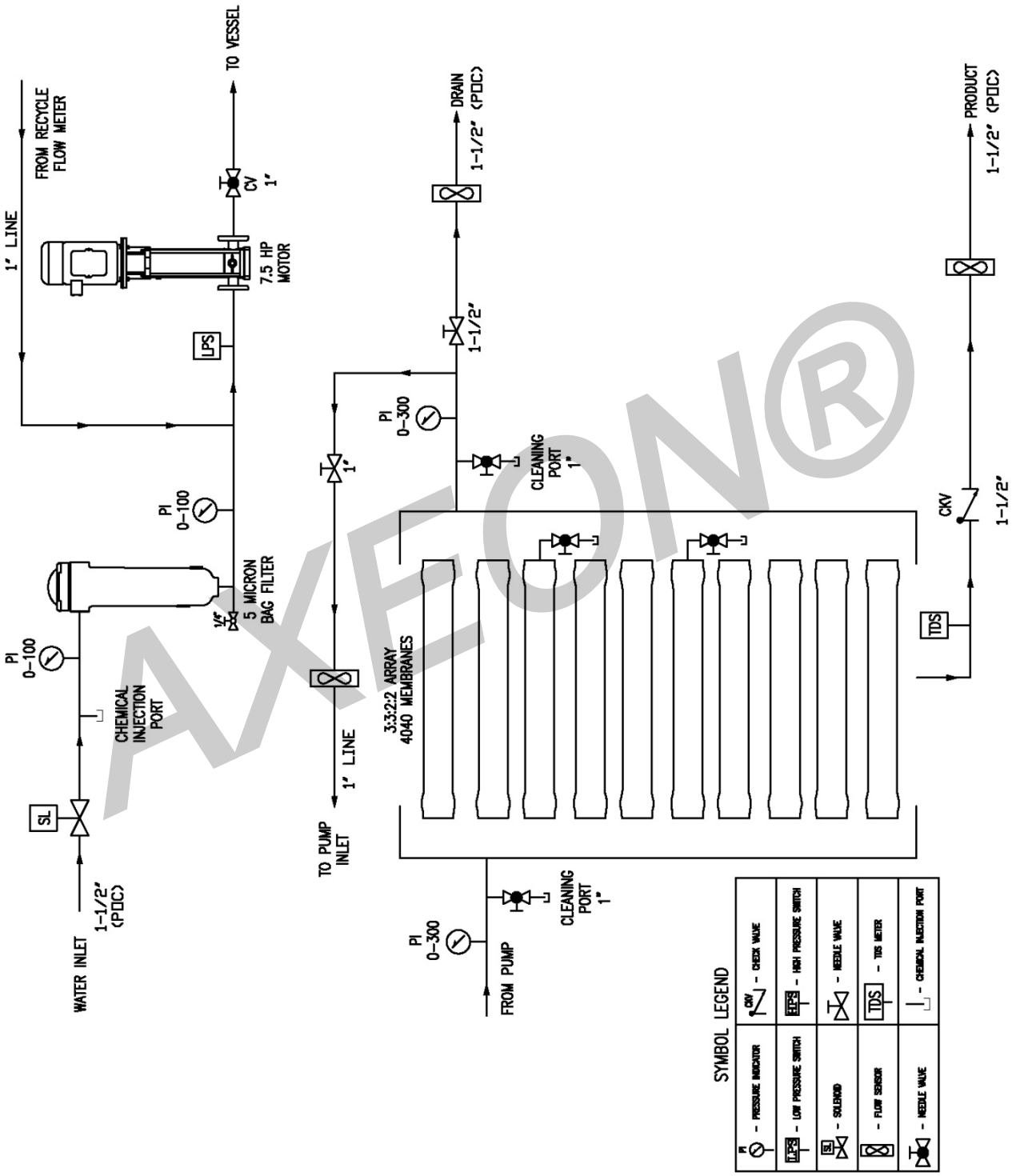
M1-10240 FLOW DIAGRAM



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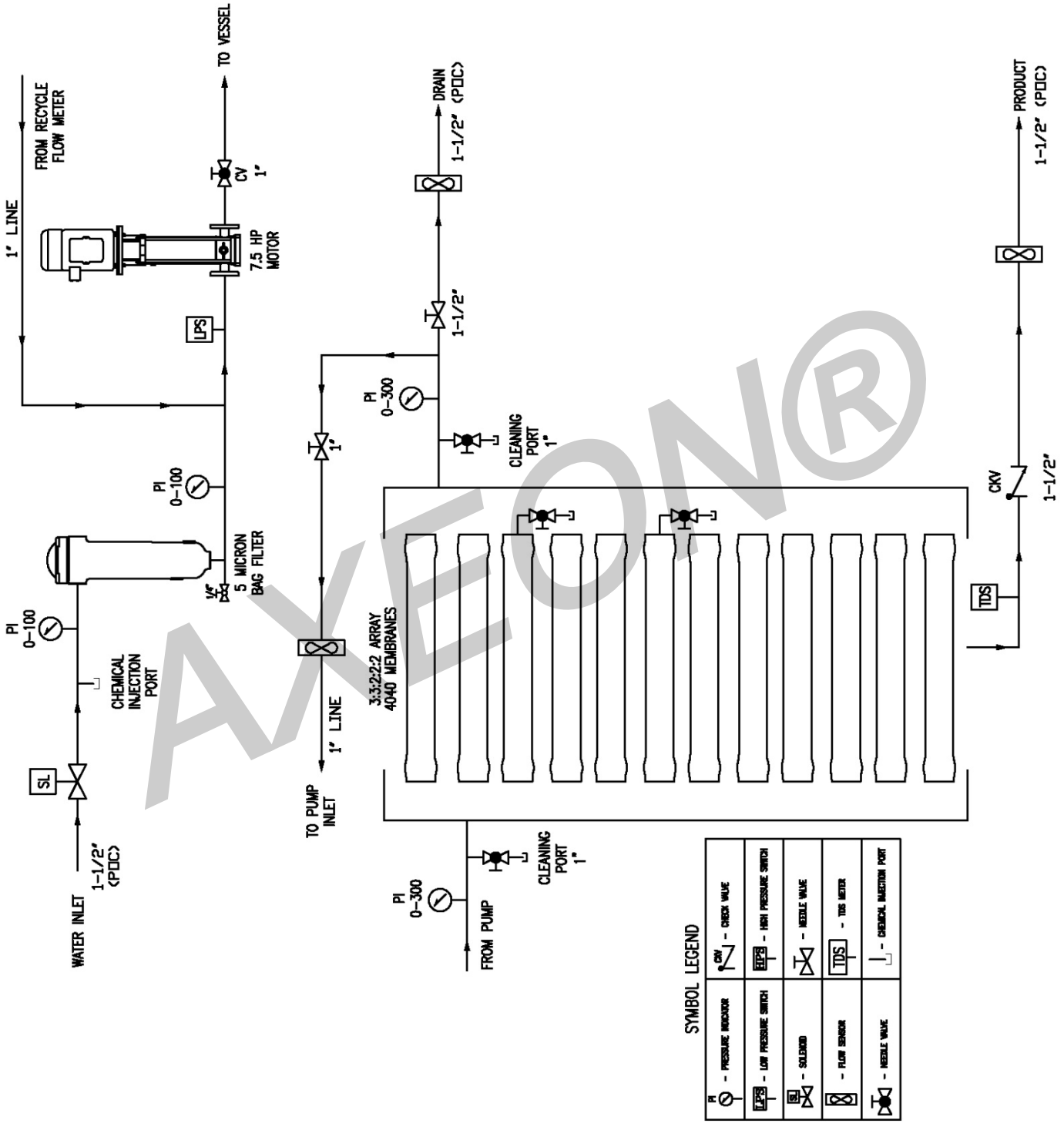
M1-12240 FLOW DIAGRAM



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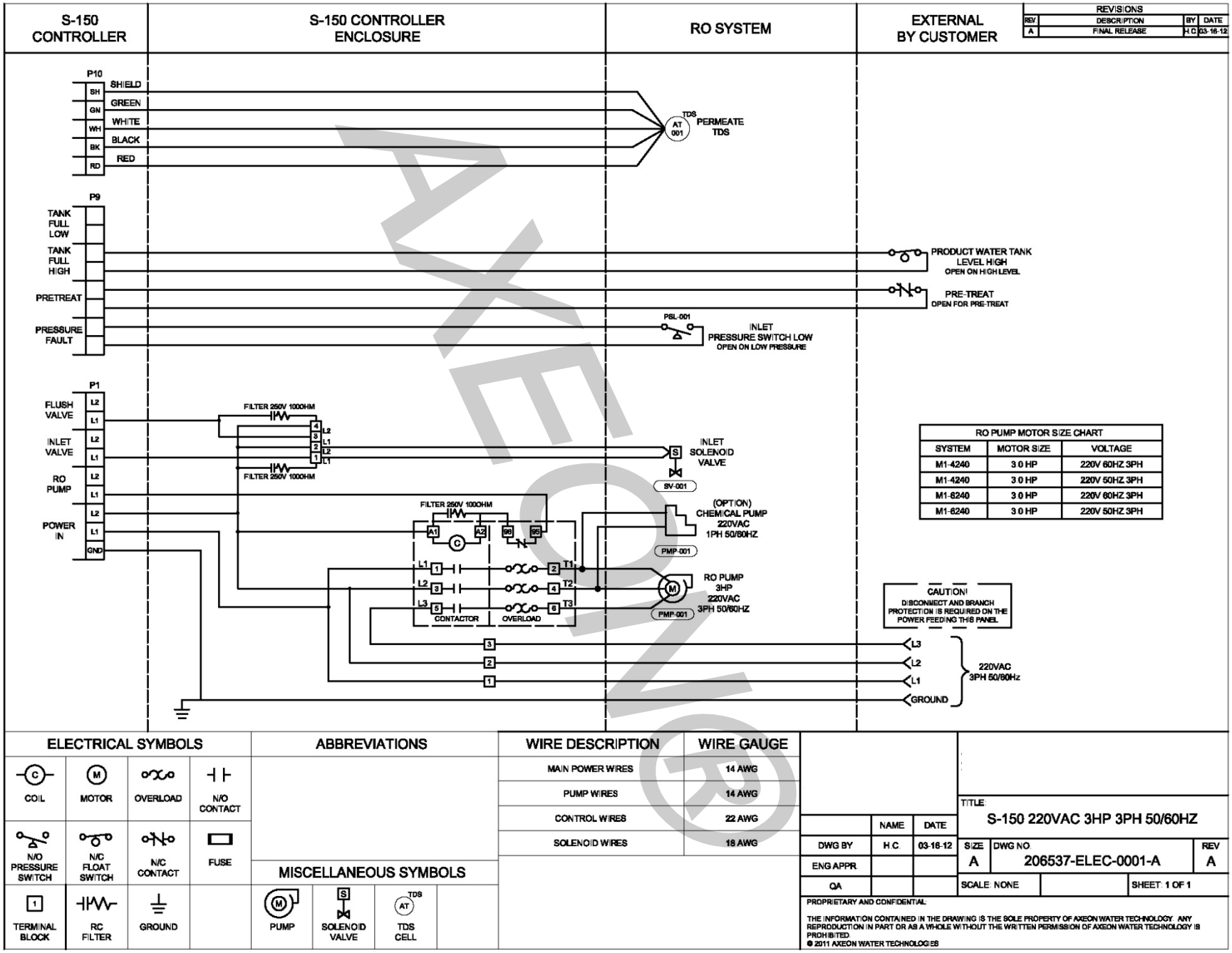
S-150 CONTROLLER
S-150 CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV | DESCRIPTION | BY | DATE
A | FINAL RELEASE | H.C. | 03-16-12
P10
SH SHIELD
GN GREEN
WH WHITE
BK BLACK
RD RED
TDS AT 001 PERMEATE TDS
P9
TANK FULL LOW
TANK FULL HIGH
PRETREAT
PRESSURE FAULT
PRODUCT WATER TANK LEVEL HIGH
OPEN ON HIGH LEVEL
PRE-TREAT
OPEN FOR PRE-TREAT
PSL-001
INLET PRESSURE SWITCH LOW
OPEN ON LOW PRESSURE
P1
FLUSH VALVE
INLET VALVE
RO PUMP
POWER IN
L2
L1
GND
FILTER 250V 100OHM
INLET SOLENOID VALVE
SV-001
(OPTION) CHEMICAL PUMP 220VAC 1PH 50/60HZ
PMP-001
RO PUMP 3HP 220VAC 3PH 50/60HZ
PMP-001
CONTACTOR
OVERLOAD
CAUTION!
DISCONNECT AND BRANCH PROTECTION IS REQUIRED ON THE POWER FEEDING THIS PANEL
220VAC 3PH 50/60Hz
L3
L2
L1
GROUND
RO PUMP MOTOR SIZE CHART
SYSTEM | MOTOR SIZE | VOLTAGE
M1-4240 | 3.0 HP | 220V 60HZ 3PH
M1-4240 | 3.0 HP | 220V 50HZ 3PH
M1-6240 | 3.0 HP | 220V 60HZ 3PH
M1-6240 | 3.0 HP | 220V 50HZ 3PH
ELECTRICAL SYMBOLS
COIL
MOTOR
OVERLOAD
N/O CONTACT
N/O PRESSURE SWITCH
N/C FLOAT SWITCH
N/C CONTACT
FUSE
TERMINAL BLOCK
RC FILTER
GROUND
ABBREVIATIONS
MISCELLANEOUS SYMBOLS
PUMP
SOLENOID VALVE
TDS CELL
WIRE DESCRIPTION | WIRE GAUGE
MAIN POWER WIRES | 14 AWG
PUMP WIRES | 14 AWG
CONTROL WIRES | 22 AWG
SOLENOID WIRES | 18 AWG
NAME | DATE
DWG BY | H.C. | 03-16-12
ENG APPR
QA
TITLE: S-150 220VAC 3HP 3PH 50/60HZ
SIZE A | DWG NO. 206537-ELEC-0001-A | REV A
SCALE: NONE | SHEET: 1 OF 1
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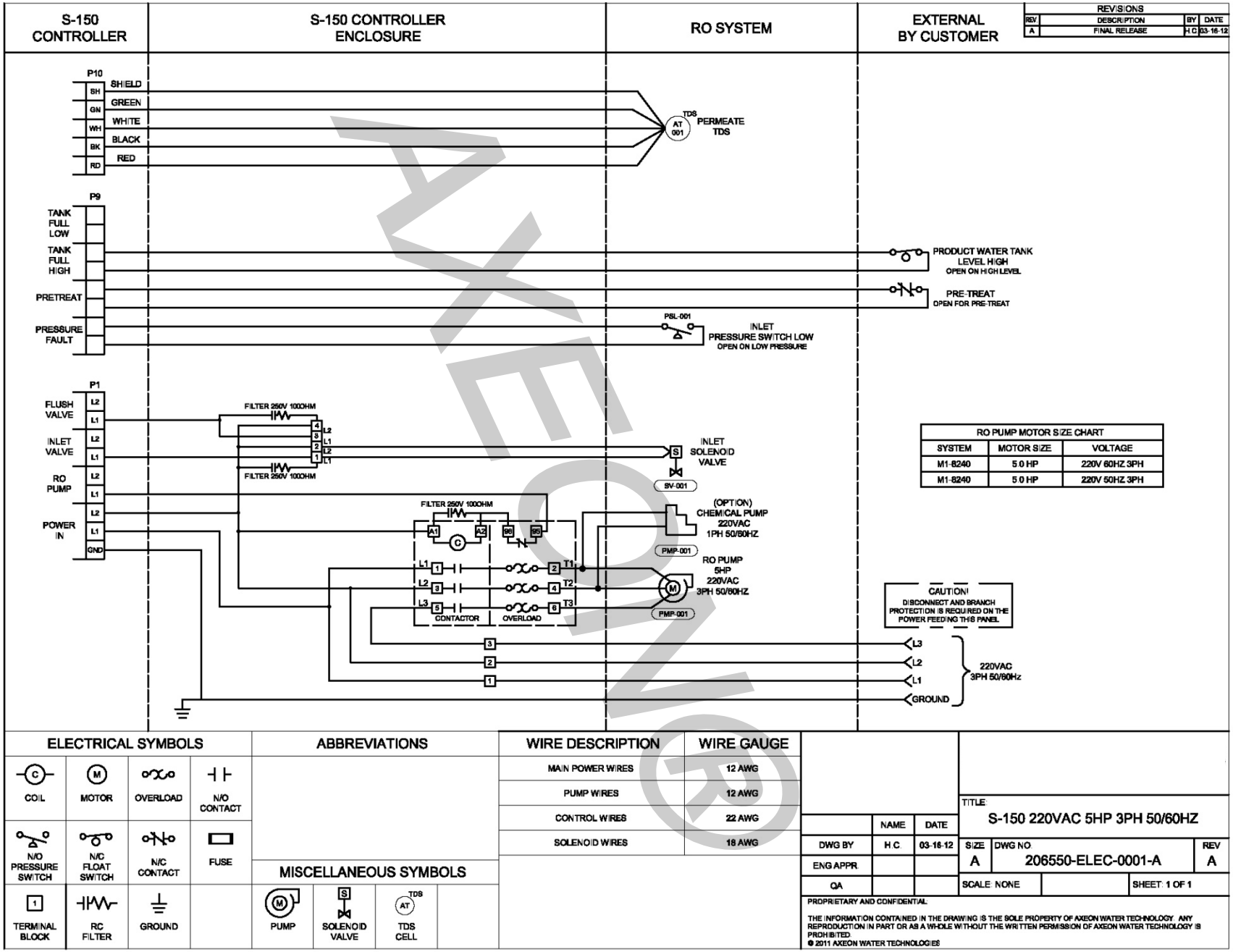
S-150 CONTROLLER
S-150 CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV | DESCRIPTION | BY | DATE
A | FINAL RELEASE | H C | 03-16-12
P10
SH SHIELD
GN GREEN
WH WHITE
BK BLACK
RD RED
TDS AT 001 PERMEATE TDS
P9
TANK FULL LOW
TANK FULL HIGH
PRETREAT
PRESSURE FAULT
PRODUCT WATER TANK LEVEL HIGH
OPEN ON HIGH LEVEL
PRE-TREAT
OPEN FOR PRE-TREAT
PSL-001
INLET PRESSURE SWITCH LOW
OPEN ON LOW PRESSURE
P1
FLUSH VALVE L2 L1
INLET VALVE L2 L1
RO PUMP L2 L1
POWER IN L2 L1 GND
FILTER 250V 1000HM
FILTER 250V 1000HM
INLET SOLENOID VALVE
SV-001
FILTER 250V 1000HM
(OPTION) CHEMICAL PUMP 220VAC 1PH 50/60HZ
PMP-001
RO PUMP 5HP 220VAC 3PH 50/60HZ
PMP-001
CONTACTOR
OVERLOAD
RO PUMP MOTOR SIZE CHART
SYSTEM | MOTOR SIZE | VOLTAGE
M1-8240 | 5.0 HP | 220V 60HZ 3PH
M1-8240 | 5.0 HP | 220V 50HZ 3PH
CAUTION!
DISCONNECT AND BRANCH PROTECTION IS REQUIRED ON THE POWER FEEDING THIS PANEL
L3
L2
L1
GROUND
220VAC 3PH 50/60Hz
ELECTRICAL SYMBOLS
COIL
MOTOR
OVERLOAD
N/O CONTACT
N/O PRESSURE SWITCH
N/C FLOAT SWITCH
N/C CONTACT
FUSE
TERMINAL BLOCK
RC FILTER
GROUND
ABBREVIATIONS
MISCELLANEOUS SYMBOLS
PUMP
SOLENOID VALVE
TDS CELL
WIRE DESCRIPTION | WIRE GAUGE
MAIN POWER WIRES | 12 AWG
PUMP WIRES | 12 AWG
CONTROL WIRES | 22 AWG
SOLENOID WIRES | 18 AWG
NAME | DATE
DWG BY | H.C | 03-16-12
ENG APPR
QA
TITLE: S-150 220VAC 5HP 3PH 50/60HZ
SIZE A | DWG NO 206550-ELEC-0001-A | REV A
SCALE: NONE | SHEET: 1 OF 1
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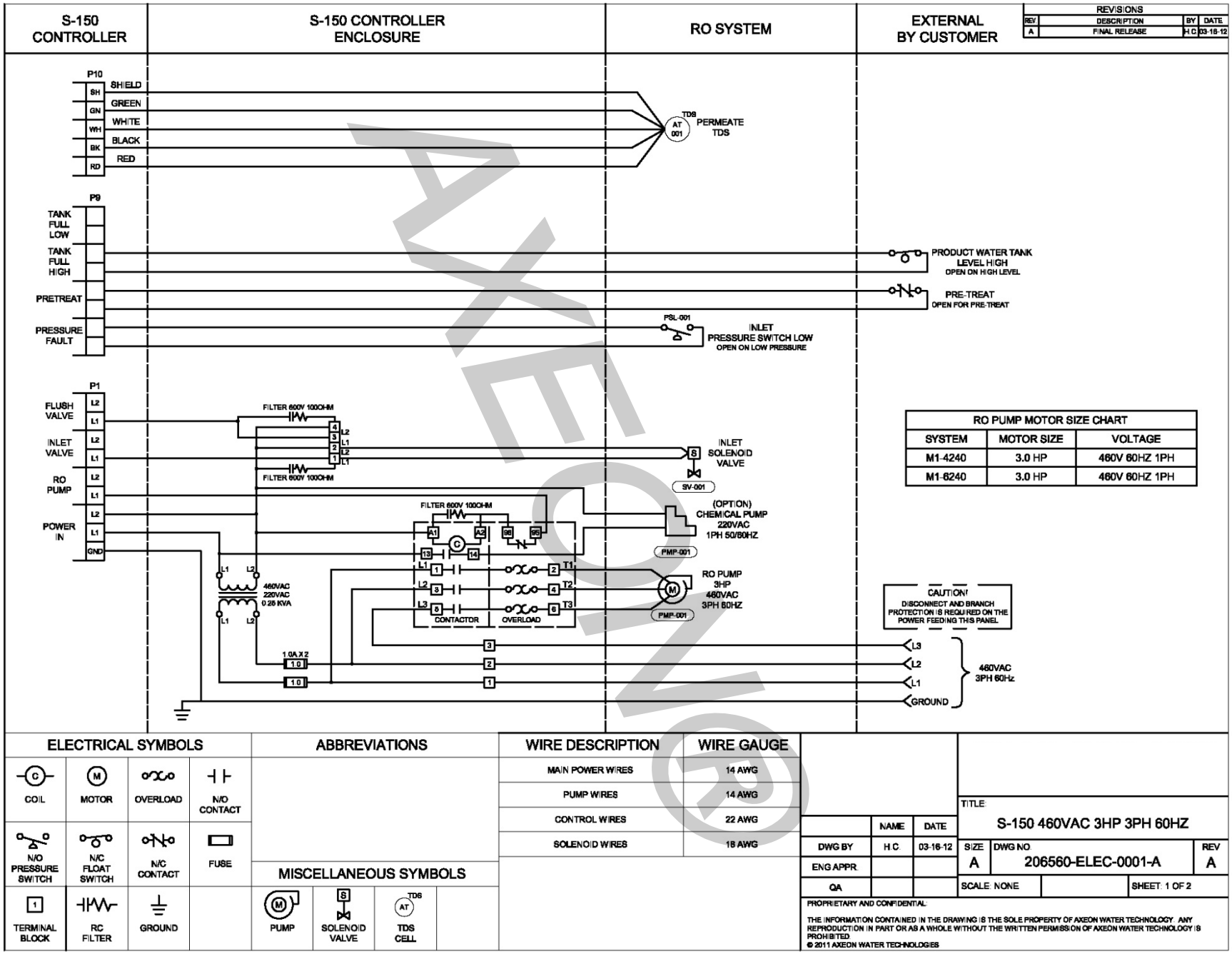
S-150 CONTROLLER
S-150 CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV | DESCRIPTION | BY | DATE
A | FINAL RELEASE | H.C. | 03-16-12
P10
SH SHIELD
GN GREEN
WH WHITE
BK BLACK
RD RED
TDS AT 001 PERMEATE TDS
P9
TANK FULL LOW
TANK FULL HIGH
PRETREAT
PRESSURE FAULT
PRODUCT WATER TANK LEVEL HIGH
OPEN ON HIGH LEVEL
PRE-TREAT
OPEN FOR PRE-TREAT
PSL-001
INLET PRESSURE SWITCH LOW
OPEN ON LOW PRESSURE
P1
FLUSH VALVE
INLET VALVE
RO PUMP
POWER IN
FILTER 600V 100OHM
INLET SOLENOID VALVE
SV-001
(OPTION) CHEMICAL PUMP 220VAC 1PH 50/60HZ
PMP-001
RO PUMP 3HP 460VAC 3PH 60HZ
CONTACTOR
OVERLOAD
460VAC 220VAC 0.25 KVA
10AX2
CAUTION! DISCONNECT AND BRANCH PROTECTION IS REQUIRED ON THE POWER FEEDING THIS PANEL
460VAC 3PH 60Hz
L3
L2
L1
GROUND
RO PUMP MOTOR SIZE CHART
SYSTEM | MOTOR SIZE | VOLTAGE
M1-4240 | 3.0 HP | 460V 60HZ 1PH
M1-6240 | 3.0 HP | 460V 60HZ 1PH
ELECTRICAL SYMBOLS
COIL
MOTOR
OVERLOAD
N/O CONTACT
N/O PRESSURE SWITCH
N/C FLOAT SWITCH
N/C CONTACT
FUSE
TERMINAL BLOCK
RC FILTER
GROUND
ABBREVIATIONS
MISCELLANEOUS SYMBOLS
PUMP
SOLENOID VALVE
TDS CELL
WIRE DESCRIPTION | WIRE GAUGE
MAIN POWER WIRES | 14 AWG
PUMP WIRES | 14 AWG
CONTROL WIRES | 22 AWG
SOLENOID WIRES | 18 AWG
NAME | DATE
DWG BY | H.C. | 03-16-12
ENG APPR.
QA
TITLE: S-150 460VAC 3HP 3PH 60HZ
SIZE A | DWG NO. 206560-ELEC-0001-A | REV A
SCALE: NONE | SHEET: 1 OF 2
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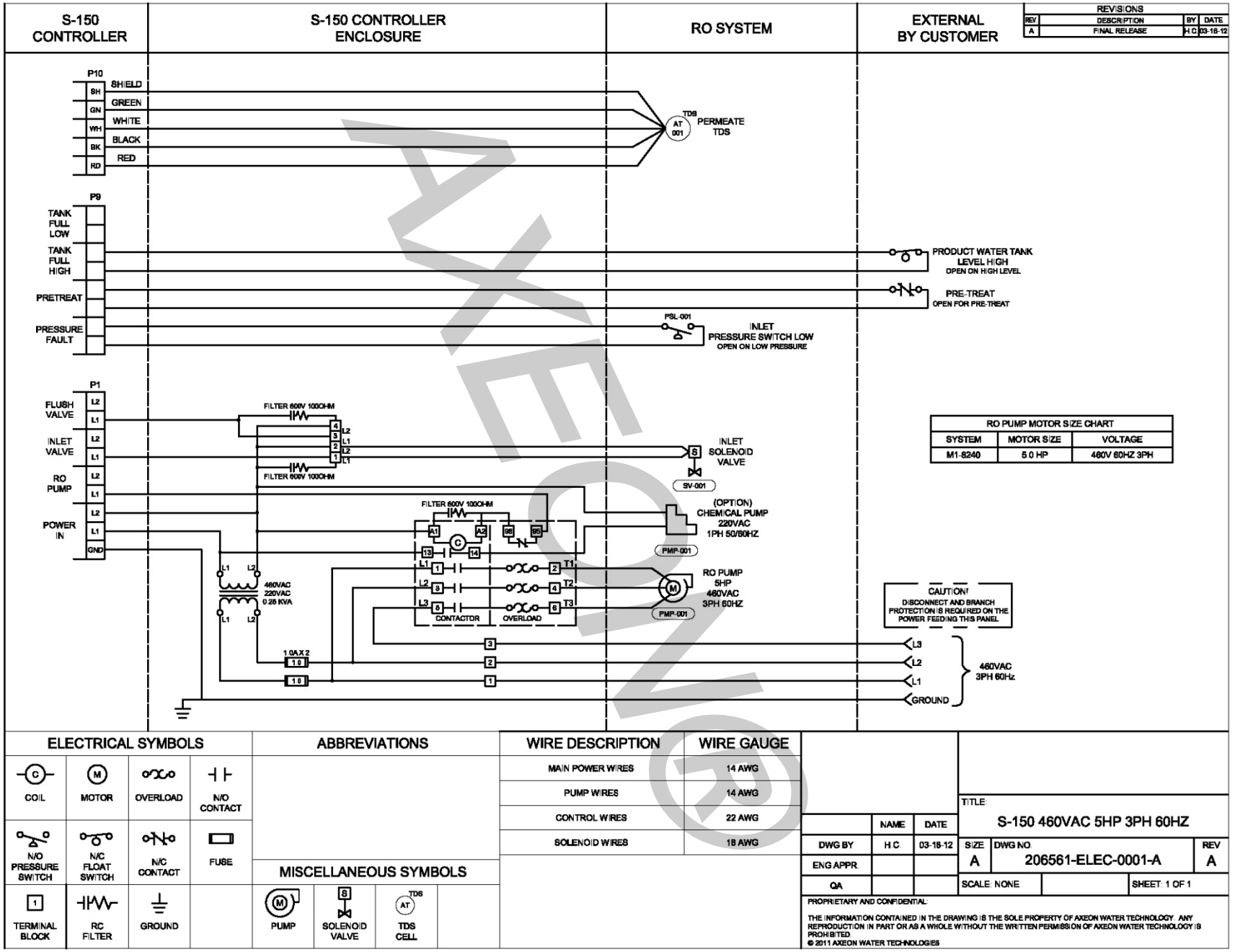
S-150 CONTROLLER
S-150 CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV | DESCRIPTION | BY | DATE
A | FINAL RELEASE | H C | 03-18-12
P10
SH SHIELD
GN GREEN
WH WHITE
BK BLACK
RD RED
TDS AT 001 PERMEATE TDS
P9
TANK FULL LOW
TANK FULL HIGH
PRETREAT
PRESSURE FAULT
PRODUCT WATER TANK LEVEL HIGH
OPEN ON HIGH LEVEL
PRE-TREAT
OPEN FOR PRE-TREAT
PSL-001
INLET PRESSURE SWITCH LOW
OPEN ON LOW PRESSURE
P1
FLUSH VALVE
INLET VALVE
RO PUMP
POWER IN
FILTER 600V 100OHM
INLET SOLENOID VALVE
SV-001
(OPTION) CHEMICAL PUMP 220VAC 1PH 50/60HZ
PMP-001
RO PUMP 5HP 460VAC 3PH 60HZ
CONTACTOR
OVERLOAD
460VAC 220VAC 0.25 KVA
1.0A X 2
RO PUMP MOTOR SIZE CHART
SYSTEM | MOTOR SIZE | VOLTAGE
M1-8240 | 5.0 HP | 460V 60HZ 3PH
CAUTION!
DISCONNECT AND BRANCH PROTECTION IS REQUIRED ON THE POWER FEEDING THIS PANEL
L3
L2
L1
GROUND
460VAC 3PH 60Hz
ELECTRICAL SYMBOLS
COIL
MOTOR
OVERLOAD
N/O CONTACT
N/O PRESSURE SWITCH
N/C FLOAT SWITCH
N/C CONTACT
FUSE
TERMINAL BLOCK
RC FILTER
GROUND
ABBREVIATIONS
MISCELLANEOUS SYMBOLS
PUMP
SOLENOID VALVE
TDS CELL
WIRE DESCRIPTION | WIRE GAUGE
MAIN POWER WIRES | 14 AWG
PUMP WIRES | 14 AWG
CONTROL WIRES | 22 AWG
SOLENOID WIRES | 18 AWG
NAME | DATE
DWG BY | H.C. | 03-18-12
ENG APPR.
QA
TITLE: S-150 460VAC 5HP 3PH 60HZ
SIZE A | DWG NO 206561-ELEC-0001-A | REV A
SCALE: NONE | SHEET: 1 OF 1
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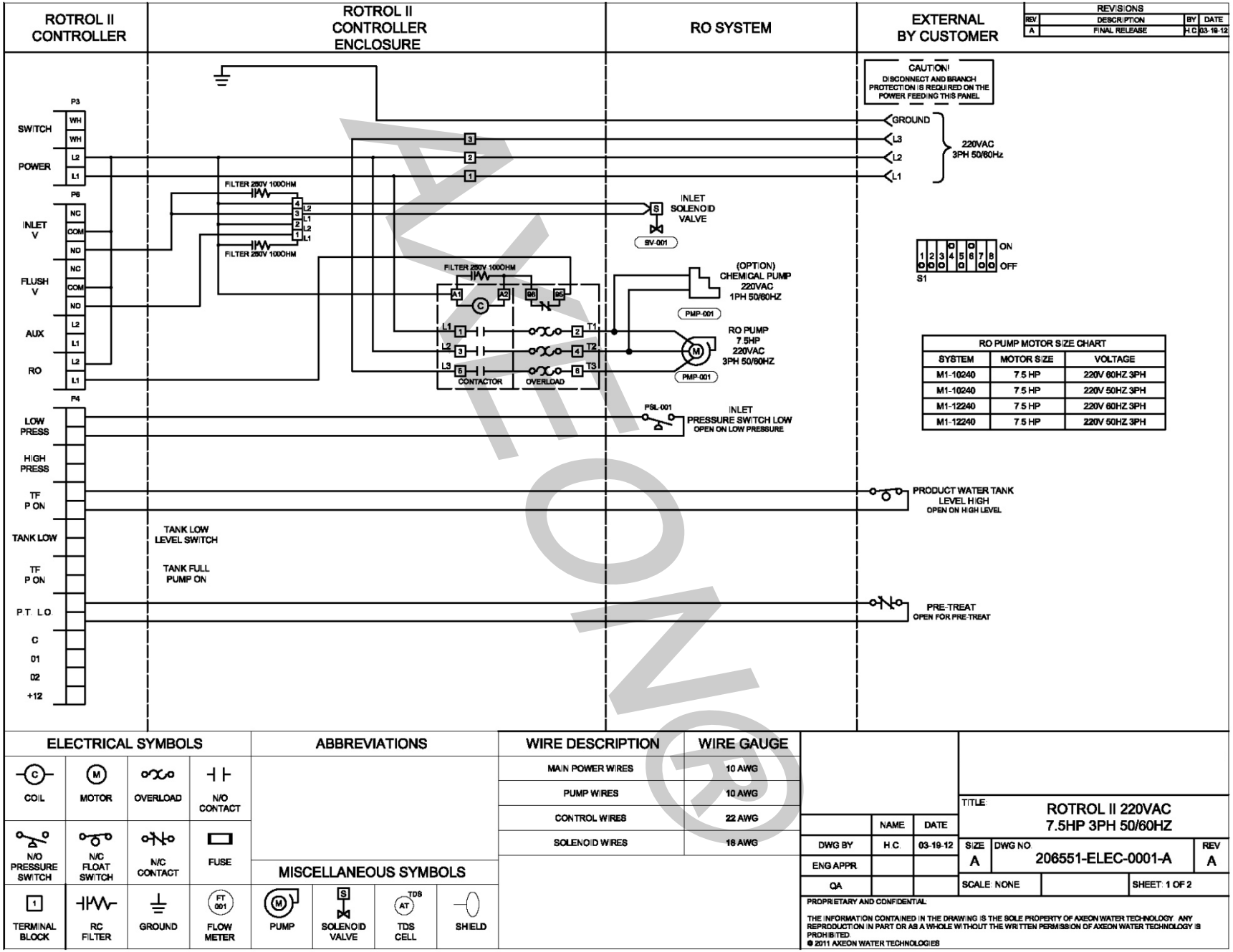
ROTROL II CONTROLLER
ROTROL II CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV | DESCRIPTION | BY | DATE
A | FINAL RELEASE | H C | 03-19-12
CAUTION! DISCONNECT AND BRANCH PROTECTION IS REQUIRED ON THE POWER FEEDING THIS PANEL
GROUND
L3
L2
L1
220VAC 3PH 50/60Hz
P3
SWITCH
WH
WH
POWER
L2
L1
P8
INLET V
NC
COM
NO
FLUSH V
NC
COM
NO
AUX
L2
L1
RO
L2
L1
P4
LOW PRESS
HIGH PRESS
TF P ON
TANK LOW
TF P ON
P.T. LO
C
01
02
+12
FILTER 250V 100OHM
FILTER 250V 100OHM
FILTER 250V 100OHM
INLET SOLENOID VALVE
SV-001
(OPTION) CHEMICAL PUMP 220VAC 1PH 50/60HZ
PMP-001
RO PUMP 7.5HP 220VAC 3PH 50/60HZ
PMP-001
CONTACTOR
OVERLOAD
PSL-001
INLET PRESSURE SWITCH LOW
OPEN ON LOW PRESSURE
ON
OFF
S1
RO PUMP MOTOR SIZE CHART
SYSTEM | MOTOR SIZE | VOLTAGE
M1-10240 | 7.5 HP | 220V 60HZ 3PH
M1-10240 | 7.5 HP | 220V 50HZ 3PH
M1-12240 | 7.5 HP | 220V 60HZ 3PH
M1-12240 | 7.5 HP | 220V 50HZ 3PH
PRODUCT WATER TANK LEVEL HIGH
OPEN ON HIGH LEVEL
TANK LOW LEVEL SWITCH
TANK FULL PUMP ON
PRE-TREAT
OPEN FOR PRE-TREAT
ELECTRICAL SYMBOLS
COIL
MOTOR
OVERLOAD
N/O CONTACT
N/O PRESSURE SWITCH
N/C FLOAT SWITCH
N/C CONTACT
FUSE
TERMINAL BLOCK
RC FILTER
GROUND
FLOW METER
ABBREVIATIONS
MISCELLANEOUS SYMBOLS
PUMP
SOLENOID VALVE
TDS CELL
SHIELD
WIRE DESCRIPTION | WIRE GAUGE
MAIN POWER WIRES | 10 AWG
PUMP WIRES | 10 AWG
CONTROL WIRES | 22 AWG
SOLENOID WIRES | 18 AWG
NAME | DATE
DWG BY | H.C. | 03-19-12
ENG APPR.
QA
TITLE: ROTROL II 220VAC 7.5HP 3PH 50/60HZ
SIZE A | DWG NO 206551-ELEC-0001-A | REV A
SCALE: NONE | SHEET: 1 OF 2
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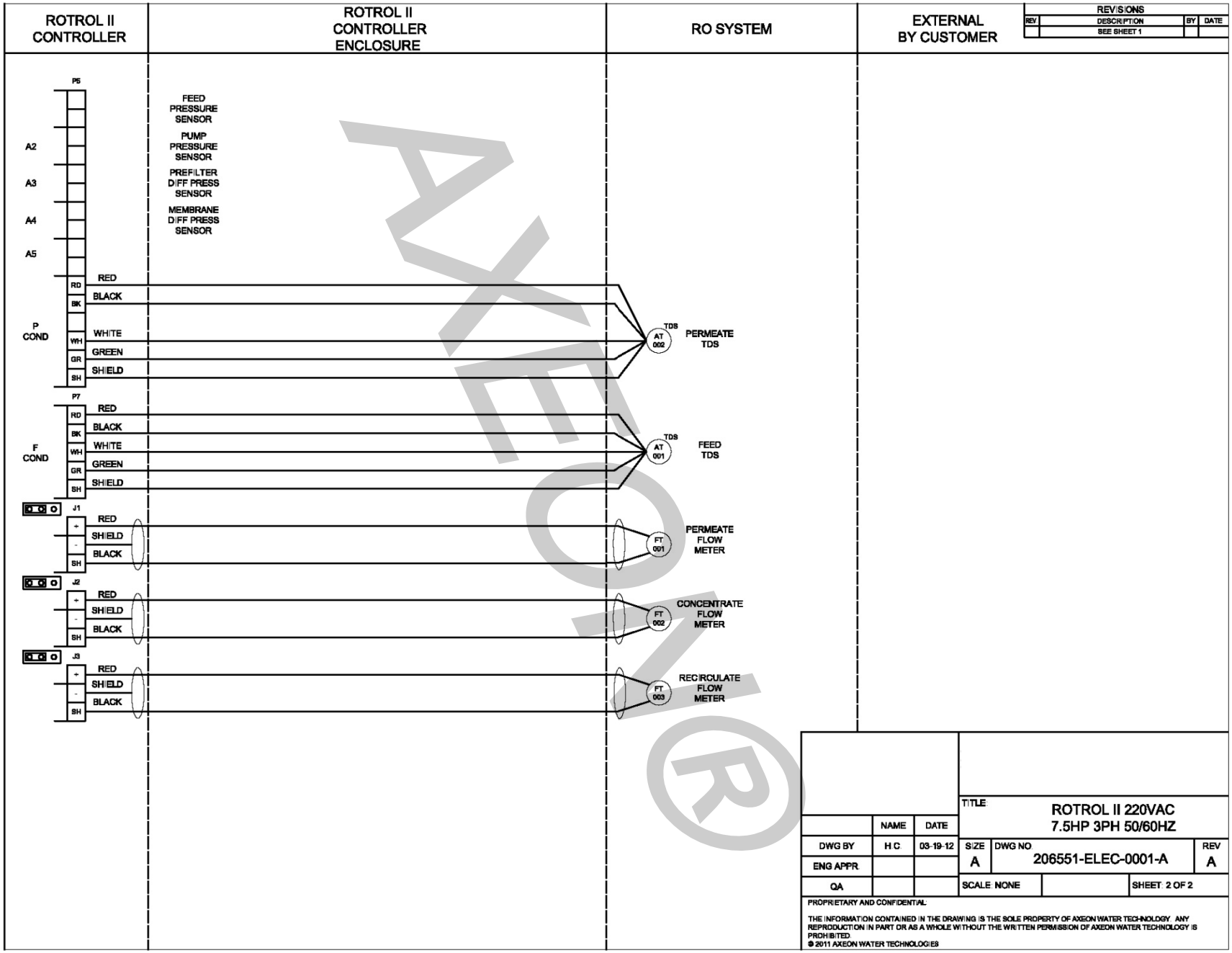
ROTROL II CONTROLLER
ROTROL II CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV
DESCRIPTION
BY
DATE
SEE SHEET 1
P5
A2
A3
A4
A5
FEED PRESSURE SENSOR
PUMP PRESSURE SENSOR
PREFILTER DIFF PRESS SENSOR
MEMBRANE DIFF PRESS SENSOR
P COND
RD
BK
WH
GR
SH
RED
BLACK
WHITE
GREEN
SHIELD
TDS
AT 002
PERMEATE TDS
P7
F COND
AT 001
FEED TDS
J1
+
-
FT 001
PERMEATE FLOW METER
J2
FT 002
CONCENTRATE FLOW METER
J3
FT 003
RECIRCULATE FLOW METER
AXEON®
NAME
DATE
DWG BY
H C
03-19-12
ENG APPR.
QA
TITLE
ROTROL II 220VAC
7.5HP 3PH 50/60HZ
SIZE
A
DWG NO
206551-ELEC-0001-A
REV
A
SCALE: NONE
SHEET 2 OF 2
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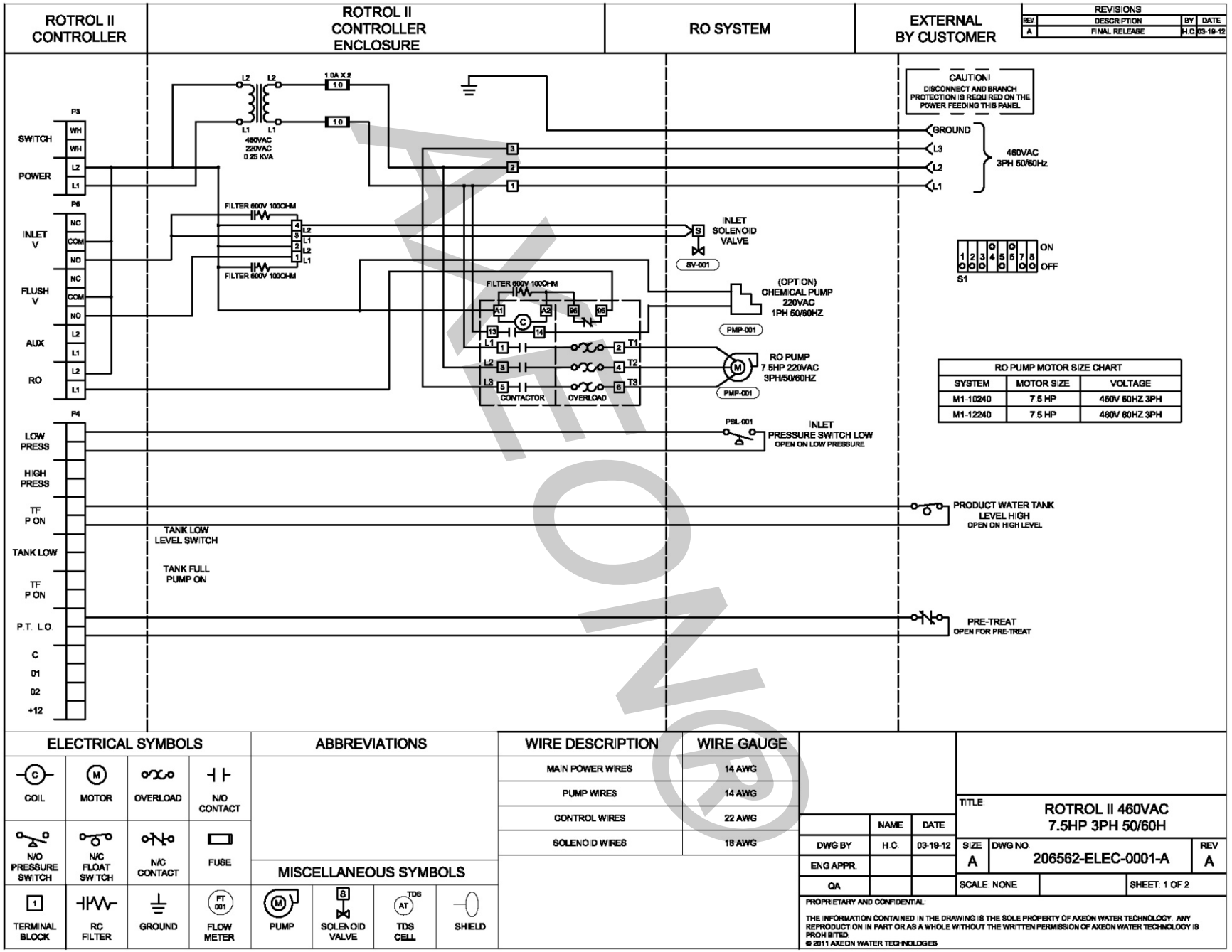
ROTROL II CONTROLLER
ROTROL II CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV | DESCRIPTION | BY | DATE
A | FINAL RELEASE | H.C. | 03-19-12
CAUTION! DISCONNECT AND BRANCH PROTECTION IS REQUIRED ON THE POWER FEEDING THIS PANEL
GROUND
L3
L2
L1
460VAC 3PH 50/60Hz
P3
SWITCH
POWER
WH
WH
L2
L1
460VAC 220VAC 0.25 KVA
1.0A X 2
P6
INLET V
FLUSH V
AUX
RO
NC
COM
NO
FILTER 600V 100OHM
INLET SOLENOID VALVE
SV-001
(OPTION) CHEMICAL PUMP 220VAC 1PH 50/60HZ
PMP-001
RO PUMP 7.5HP 220VAC 3PH/50/60HZ
CONTACTOR
OVERLOAD
S1
ON
OFF
RO PUMP MOTOR SIZE CHART
SYSTEM | MOTOR SIZE | VOLTAGE
M1-10240 | 7.5 HP | 460V 60HZ 3PH
M1-12240 | 7.5 HP | 460V 60HZ 3PH
P4
LOW PRESS
HIGH PRESS
TF P ON
TANK LOW
P.T. LO
C
01
02
+12
PSL-001
INLET PRESSURE SWITCH LOW OPEN ON LOW PRESSURE
PRODUCT WATER TANK LEVEL HIGH OPEN ON HIGH LEVEL
TANK LOW LEVEL SWITCH
TANK FULL PUMP ON
PRE-TREAT OPEN FOR PRE-TREAT
ELECTRICAL SYMBOLS
COIL
MOTOR
OVERLOAD
N/O CONTACT
N/O PRESSURE SWITCH
N/C FLOAT SWITCH
N/C CONTACT
FUSE
TERMINAL BLOCK
RC FILTER
GROUND
FLOW METER
ABBREVIATIONS
MISCELLANEOUS SYMBOLS
PUMP
SOLENOID VALVE
TDS CELL
SHIELD
WIRE DESCRIPTION | WIRE GAUGE
MAIN POWER WIRES | 14 AWG
PUMP WIRES | 14 AWG
CONTROL WIRES | 22 AWG
SOLENOID WIRES | 18 AWG
NAME | DATE
DWG BY | H.C. | 03-19-12
ENG APPR
QA
TITLE: ROTROL II 460VAC 7.5HP 3PH 50/60H
SIZE A | DWG NO. 206562-ELEC-0001-A | REV A
SCALE: NONE | SHEET: 1 OF 2
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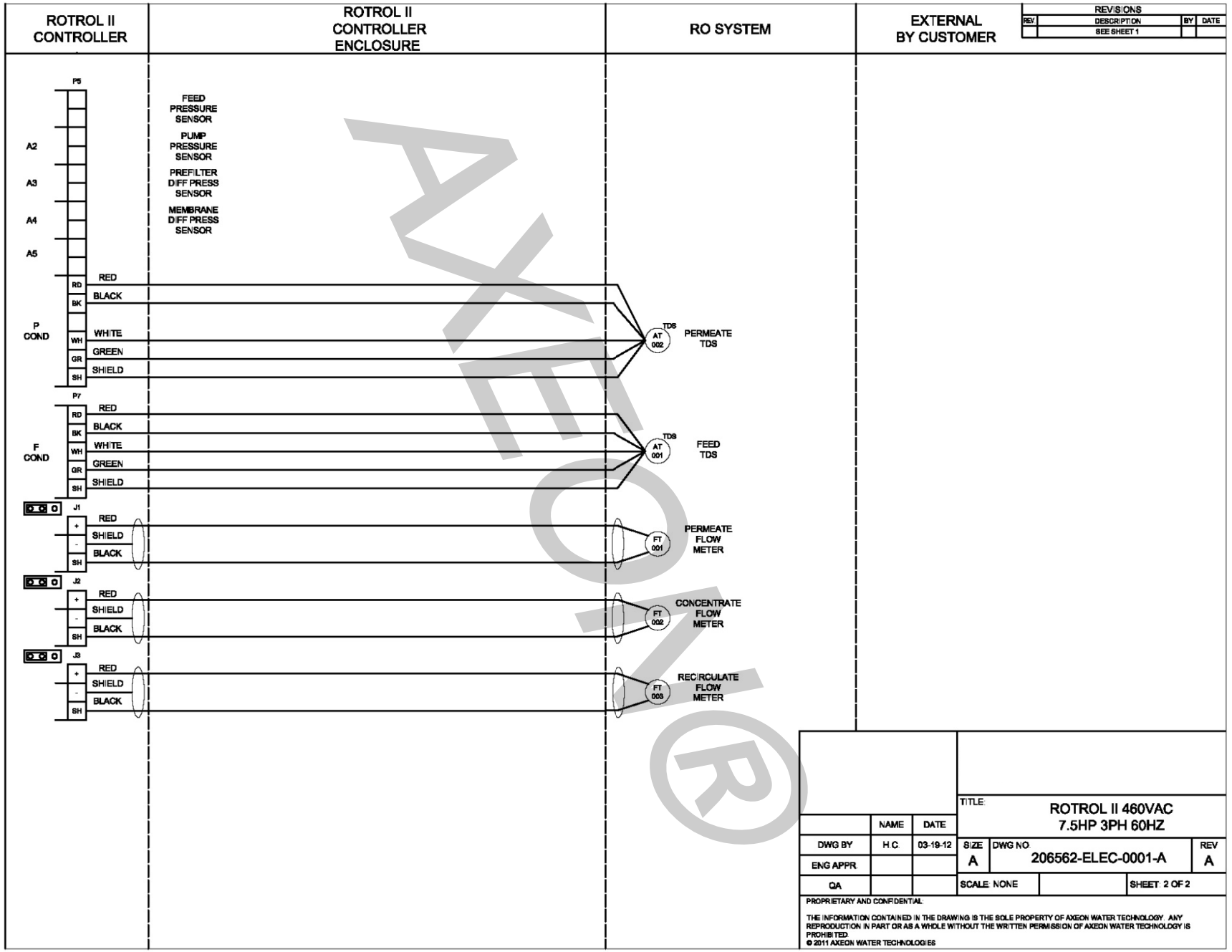
ROTROL II CONTROLLER
ROTROL II CONTROLLER ENCLOSURE
RO SYSTEM
EXTERNAL BY CUSTOMER
REVISIONS
REV DESCRIPTION BY DATE
SEE SHEET 1
P5
A2
A3
A4
A5
FEED PRESSURE SENSOR
PUMP PRESSURE SENSOR
PREFILTER DIFF PRESS SENSOR
MEMBRANE DIFF PRESS SENSOR
P COND
RD RED
BK BLACK
WH WHITE
GR GREEN
SH SHIELD
TDS AT 002 PERMEATE TDS
P7
F COND
RD RED
BK BLACK
WH WHITE
GR GREEN
SH SHIELD
TDS AT 001 FEED TDS
J1
+ RED
- SHIELD
SH BLACK
FT 001 PERMEATE FLOW METER
J2
+ RED
- SHIELD
SH BLACK
FT 002 CONCENTRATE FLOW METER
J3
+ RED
- SHIELD
SH BLACK
FT 003 RECIRCULATE FLOW METER
AXEON®
TITLE: ROTROL II 460VAC 7.5HP 3PH 60HZ
NAME DATE
DWG BY H.C. 03-19-12
ENG APPR.
QA
SIZE A
DWG NO. 206562-ELEC-0001-A
REV A
SCALE: NONE
SHEET: 2 OF 2
PROPRIETARY AND CONFIDENTIAL
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